

Twelfth Census of the United States.

# CENSUS BULLETIN.

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## AGRICULTURE.

### MASSACHUSETTS.

Hon. WILLIAM R. MERRIAM,  
*Director of the Census.*

SIR: I have the honor to transmit herewith, for publication in bulletin form, the statistics of agriculture for the state of Massachusetts, taken in accordance with the provisions of section 7 of the act of March 3, 1899. This section requires that—

The schedules relating to agriculture shall comprehend the following topics: Name of occupant of each farm, color of occupant, tenure, acreage, value of farm and improvements, acreage of different products, quantity and value of products, and number and value of live stock. All questions as to quantity and value of crops shall relate to the year ending December thirty-first next preceding the enumeration.

A "farm," as defined by the Twelfth Census, includes all the land, under one management, used for raising crops and pasturing live stock, with the wood lots, swamps, meadows, etc., connected therewith. It also includes the house in which the farmer resides and all other buildings used by him in connection with his farming operations.

The farms of Massachusetts, June 1, 1900, numbered 37,715, and had a value of \$158,019,290. Of this amount \$71,093,880, or 45.0 per cent, represents the value of buildings, and \$86,925,410, or 55.0 per cent, the value of land and improvements other than buildings. On the same date the value of farm implements and machinery was \$8,828,950, and that of live stock was \$15,798,464. These values, added to that of farms, give the "total value of farm property," \$182,646,704.

The term "value of farm products," as used in this bulletin, has reference to the value of all crops and animal products, including the value of animals sold or slaughtered

on farms. This valuation for 1899 was \$42,298,274, of which amount \$19,140,730, or 45.3 per cent, represents the value of products of the live-stock industry, and \$23,157,544, or 54.7 per cent, the value of crops, including forest products. The value of farm products in 1899 was \$14,225,774 greater than that reported in 1890, showing an increase of 50.7 per cent, but a large part of this is doubtless due to a more detailed enumeration in 1900 than in 1890. Of the actual increase, the greater part has been in the products of market gardens, dairies, and poultry farms. Cereal production and the raising of live stock continue to decrease in importance.

The value of "net farm products" or the "gross farm income" is obtained by deducting the value of the products fed to live stock on the farms of the producers from the value of all farm products. In 1899 the reported value of products fed was \$8,264,710, leaving \$34,033,564 as the gross farm income for that year. The percentage which this amount is of the "total value of farm property" is referred to in the text of the bulletin as the "percentage of income upon investment." For Massachusetts, in 1899, it was 18.6 per cent.

As no reports of expenditures for taxes, interest, insurance, feed for stock, and similar items have been obtained by any census, no statement of net farm income can be given.

Very respectfully,

*L. G. Powers.*  
*Chief Statistician for Agriculture.*

# AGRICULTURE IN MASSACHUSETTS.

## GENERAL STATISTICS.

The total land area of Massachusetts is 8,040 square miles, of which 4,917 square miles, or 61.2 per cent, are included in farms. The western end of the state is crossed by two low mountain ranges, from which a rugged table-land, cleft by deep and narrow river valleys, extends to the Connecticut River. East of this river, the surface is hilly or undulating through the central part, and then slopes gradually toward the Atlantic, terminating in low lands in the southeast and in flat capes and islands along the coast.

The western part of the state has but little naturally fertile soil, the land, except in the river valleys, being better suited for grazing than for cultivation. The soil of the central and northeastern counties is generally arable, and with careful and scientific cultivation yields good returns. The southeastern, or coast, counties contain numerous swamps and bogs, where cranberry culture is more extensively engaged in than in any other part of the United States. Cape Cod and the islands consist largely of barren tracts of sand and have but little arable soil.

### NUMBER AND SIZE OF FARMS.

The following table gives, by decades since 1850, the number of farms, the total and average acreage, and the percentage of farm land improved.

TABLE 1.—FARMS AND FARM ACREAGE: 1850 TO 1900.

YEAR.	Number of farms.	NUMBER OF ACRES IN FARMS.				Per cent of farm land improved.
		Total.	Improved.	Unimproved.	Average.	
1900.....	37,715	8,147,064	1,292,132	1,854,932	83.4	41.1
1890.....	34,374	2,998,282	1,657,024	1,341,258	87.2	55.3
1880.....	38,406	3,359,079	2,123,311	1,230,768	87.5	63.4
1870.....	26,500	2,730,283	1,786,221	944,062	103.0	63.6
1860.....	35,001	3,338,724	2,155,512	1,183,212	93.8	64.6
1850.....	34,069	3,356,012	2,133,436	1,222,576	98.5	63.6

Since 1850 the number of farms has increased 3,646, or 10.7 per cent. The total acreage has decreased 6.2 per cent; the improved acreage, 39.4 per cent; and the average size of farms, 16.2 per cent. In the last decade there has been an increase of 9.7 per cent in the number of farms, and of 5.0 per cent in the total acreage. The average size of farms is 4 acres less than in 1890 and smaller than at any previous date.

In Massachusetts, as in nearly all of the North Atlantic states, there has been a very marked decrease since 1880

in the acreage of improved farm land. This change, one of the most significant in New England agriculture, has been accompanied by a decrease in the acreage devoted to cereals, and a marked development in dairying, market gardening, and horticulture, resulting in an increase in the productive power of the average farm. The most fertile lands and those most easily tilled have been retained under cultivation and made increasingly productive. As a result, the aggregate income derived from meadow, orchard, and plow lands is now greater than it was in 1860, although the acreage under cultivation is considerably less. The less fertile lands have been found to afford greater incomes as permanent pasture than as meadow or plow lands, and each decade since 1870 has shown an increasing acreage of such land reported as unimproved.

### FARM PROPERTY AND PRODUCTS.

Table 2 presents a summary of the principal statistics relating to farm property and products for each census year beginning with 1850.

TABLE 2.—VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, AND FARM PRODUCTS: 1850 TO 1900.

YEAR.	Total value of farm property.	Land, improvements, and buildings.	Implements and machinery.	Live stock.	Farm products. <sup>1</sup>
1900.....	\$182,646,704	\$158,019,290	\$8,828,950	\$15,798,464	\$42,298,274
1890.....	147,677,402	127,538,284	6,988,940	14,200,178	28,072,600
1880.....	164,288,956	146,197,415	5,134,537	12,957,004	24,160,881
1870.....	133,482,891	116,432,784	6,000,879	17,049,228	82,192,378
1860.....	139,888,690	123,255,948	8,894,998	12,737,744	-----
1850.....	121,933,641	100,076,347	3,209,584	9,647,710	-----

<sup>1</sup> For year preceding that designated.

<sup>2</sup> Values of 1870 were reported in depreciated currency. To reduce to specie basis of other figures they must be diminished one-fifth.

<sup>3</sup> Includes betterments and additions to live stock.

Since 1850 the total value of farm property has increased \$60,713,063, and in the last decade, \$34,969,302. Of the latter amount \$30,481,006, or 87.2 per cent, represents the increase in the value of land and buildings; \$2,890,010, or 8.2 per cent, in that of implements and machinery; and \$1,598,286, or 4.6 per cent, in that of live stock. A portion of the increase shown in the value of implements and machinery is doubtless the result of a more detailed enumeration in 1900 than heretofore.

### COUNTY STATISTICS.

Table 3 gives an exhibit of general agricultural statistics by counties.

TABLE 3.—NUMBER AND ACREAGE OF FARMS, AND VALUES OF SPECIFIED CLASSES OF FARM PROPERTY, JUNE 1, 1900, WITH VALUE OF PRODUCTS OF 1899 NOT FED TO LIVE STOCK, AND EXPENDITURES IN 1899 FOR LABOR AND FERTILIZERS, BY COUNTIES.

COUNTIES.	NUMBER OF FARMS.		ACRES IN FARMS.		VALUES OF FARM PROPERTY.				Value of products not fed to live stock.	EXPENDITURES.	
	Total.	With build-ings.	Total.	Improved.	Land and improve-ments (except buildings).	Buildings.	Imple-ments and ma-chinery.	Live stock.		Labor.	Fertilizers.
The State -----	37,715	36,703	3,147,664	1,292,132	\$86,925,410	\$71,093,880	\$8,828,950	\$15,768,464	\$34,033,564	\$7,487,230	\$1,820,600
Barnstable-----	809	758	44,253	16,963	1,045,530	952,360	146,820	178,858	765,172	133,870	18,170
Berkshire-----	3,436	3,281	472,288	200,034	7,968,550	6,432,550	675,070	2,554,587	2,369,202	553,373	52,780
Bristol-----	3,453	3,408	195,694	73,919	5,787,000	5,909,030	780,510	2,222,854	2,829,089	586,550	145,320
Dukes-----	212	210	31,188	14,461	423,240	314,100	35,090	79,005	125,504	21,463	2,550
Essex-----	2,942	2,879	170,589	89,274	9,298,650	6,607,280	918,920	1,351,616	3,350,222	742,303	143,820
Franklin-----	3,280	3,226	350,032	127,786	4,343,180	3,957,380	645,710	2,289,227	2,493,628	378,123	107,100
Hampden-----	2,583	2,533	292,163	121,851	4,827,500	4,468,590	631,860	1,123,418	2,263,099	438,830	93,940
Hampshire-----	3,517	3,310	321,624	134,180	4,935,510	5,149,240	609,040	1,813,692	2,670,534	447,253	157,260
Middlesex-----	4,955	4,875	316,670	145,130	13,256,450	13,660,720	1,085,010	2,630,657	6,376,125	1,707,670	277,300
Nantucket-----	54	51	4,777	2,026	70,450	49,150	8,250	24,119	36,009	5,123	820
Norfolk-----	2,212	2,175	115,053	48,581	6,709,190	5,310,710	560,460	1,055,750	2,117,837	529,000	61,860
Plymouth-----	2,533	2,478	150,175	56,984	4,052,270	4,574,700	252,160	680,211	2,151,114	622,609	61,300
Suffolk-----	162	153	4,230	3,207	3,482,500	990,940	70,220	87,183	402,831	124,836	12,520
Worcester-----	7,550	7,361	669,388	257,733	15,705,390	12,717,070	1,820,300	3,272,257	6,083,578	1,196,260	135,890

The number of farms in the state, June 1, 1900, was 3,341 greater than in 1890, an increase having occurred in every county, except Dukes and Hampden. The largest relative gains are shown for the counties near Boston, the rate of increase for Suffolk county being 285.7 per cent; for Plymouth county, 23.4 per cent; and for Norfolk county, 21.7 per cent. The rates of decrease for Dukes and Hampden counties were 15.9 per cent and 0.7 per cent, respectively.

The portion of the land surface included in farms varied from 12.5 per cent in Nantucket county to 82.2 per cent in Hampshire county, and the average size of farms, from 26.4 acres in Suffolk county to 161.3 acres in Dukes county. A decrease, since 1890, in the area of improved land is shown for all counties except Barnstable, Nantucket, Plymouth, and Suffolk.

The value of farms increased in every county except Dukes, the gain being at the greatest rate in Suffolk, where it amounted to 319.4 per cent. The counties showing the next largest percentages of gain are Nantucket and Plymouth, for which the percentages are 44.9 and 38.7, respectively. For Dukes county the decrease in the value of farms amounts to 8.9 per cent, but, as the farm acreage decreased still more rapidly, there was an increase in the average value per acre from \$21.08 to \$21.57.

While the increase in the value of farms is, in general, the natural result of the development of intensive agriculture and consequent additions to buildings and other improvements, the very marked gain in the immediate vicinity of large cities is due principally to the appreciation in the value of suburban land held in anticipation of its ultimate sale for building purposes. The present high value of the farms of Suffolk county, for example, is not based upon productiveness but rather upon prospective use for other than agricultural purposes.

The total value of live stock was 11.2 per cent greater

in 1900 than in 1890. Berkshire and Dukes counties show decreases of 7.7 per cent and 5.6 per cent, respectively, resulting principally from a decrease in the number of neat cattle. The largest increases were reported for Worcester, Middlesex, and Essex counties, in the order named. Except in Plymouth county there was a general increase in the valuation of implements and machinery throughout the state.

The average expenditure per farm for labor, including the value of board furnished, was \$199 for the state, and ranged from \$95 in Nantucket county to \$771 in Suffolk county. The average expenditure per farm for fertilizers increased from \$26.08 in 1889 to \$35.02 in 1899. The average amount expended in the latter year ranged from \$12 per farm in Dukes county to \$77 per farm in Suffolk county. The percentage of increase per county was greatest in Barnstable, where it amounted to 145.4 per cent, and least in Suffolk, where it was only 1.5 per cent.

#### FARM TENURE.

Table 4 gives a comparative exhibit of farm tenure for 1880, 1890, and 1900. In Table 5 the tenure of farms for 1900 is given by race of farmer, and the farms operated by owners are subdivided into groups, designated as "owners," "part owners," "owners and tenants," and "managers." These terms denote, respectively: (1) Farms operated by individuals who own all the land they cultivate; (2) farms operated by individuals who own a part of the land and rent the remainder from others; (3) farms operated under the joint direction and by the united labor of two or more individuals, one owning the farm or a part of it, and the other or others owning no part, but receiving for supervision or labor a share of the products; and (4) farms operated by individuals who receive for their supervision and other services a fixed salary from the owners.

TABLE 4.—NUMBER AND PER CENT OF FARMS OF SPECIFIED TENURES: 1880 TO 1900.

YEAR.	Total number of farms.	NUMBER OF FARMS OPERATED BY—			PER CENT OF FARMS OPERATED BY—		
		Owners. <sup>1</sup>	Cash tenants.	Share tenants.	Own-ers. <sup>1</sup>	Cash tenants.	Share tenants.
1900	87,715	84,112	8,121	482	90.4	8.3	1.3
1890	84,874	81,177	2,304	893	90.7	6.7	2.6
1880	85,406	85,266	2,292	848	91.8	6.0	2.2

<sup>1</sup> Including "part owners," "owners and tenants," and "managers."

TABLE 5.—FARMS OF SPECIFIED TENURES CLASSIFIED BY RACE OF FARMER, JUNE 1, 1900, WITH PERCENTAGES.

PART 1.—NUMBER OF FARMS OF SPECIFIED TENURES.

RACE.	Total number of farms.	Own-ers.	Part own-ers.	Own-ers and tenants.	Man-agers.	Cash tenants.	Share tenants.
The State.....	87,715	80,646	1,579	856	1,581	8,121	482
White.....	37,605	30,559	1,577	856	1,527	3,198	478
Colored.....	110	87	2		4	13	4
Chinese.....	1	1					1
Indian.....	22	21					
Negro.....	87	65	2		4	13	8

PART 2.—PER CENT OF FARMS OF SPECIFIED TENURES.

The State.....	100.0	81.2	4.2	0.9	4.1	8.3	1.3
White.....	100.0	81.8	4.2	0.9	4.0	8.3	1.3
Colored.....	100.0	79.1	1.8	( <sup>1</sup> )	3.6	11.9	3.6

<sup>1</sup> Less than one-tenth of 1 per cent.

The number of farms operated by owners, although it is less than it was in 1880 by 1,154, or 3.3 per cent, is greater than it was in 1890 by 2,935, or 9.4 per cent; the number operated by tenants has increased 463, or 14.7 per cent, since 1880, and 406, or 12.7 per cent, since 1890.

The increase in the number of tenant-operated farms was entirely in the cash-tenant class, the number of share tenants having decreased 43.2 per cent since 1880. In that year 27.0 per cent of all tenants were share tenants, but in 1900 only 13.4 per cent were of that class. This change in the relative number of cash and share tenants is the result of a growing sentiment on the part of both landlord and tenant in favor of the cash-payment system, and indicates greater independence and financial responsibility on the part of the tenant class as a whole. This statement is borne out by the fact that the largest relative numbers of share tenants are found in the western and southeastern counties where cultivation is less intensive than in the central and northeastern counties. In Suffolk, Essex, Norfolk, Middlesex, and Bristol counties, less than 12 per cent of all tenants are share tenants. In the counties of Berkshire, Franklin, Hampshire, and Hampden, approximately 25 per cent are share tenants, and in Dukes, Nantucket, and Barnstable counties, about 40 per cent are of this class.

No previous census has reported the number of farms operated by "part owners," "owners and tenants," or "managers," but it is believed that the number of farms

conducted by the last-named class is constantly increasing. Practically the same conditions with respect to tenure prevail among colored as among white farmers.

OWNERSHIP OF RENTED FARMS.

The ownership of 3,166 of the 3,603 rented farms was ascertained by the enumerators; that of 437 was unreported. The titles to the 3,166 farms are vested in 3,070 owners, an average of 103 farms to every 100 owners. Of the 3,070 owners, 2,998 possess 1 farm each; 58, 2 each; 10, 3 each; and the remaining 4 own 4, 5, 6, and 7 farms, respectively. Of the 3,070 owners, 2,732, possessing 2,828 farms, reside in Massachusetts. The owners of 2,330 of these farms reside in the county in which their farms are located.

The nonresident owners reside in the following groups of states or in foreign countries: 279, in the North Atlantic states; 7, in the South Atlantic states; 24, in the North Central states; 5, in the South Central states; 15, in the Western states; and 8, in foreign countries. None of these nonresidents owns more than 1 farm. The value of the 338 farms owned by nonresidents is \$1,301,215, an average of \$3,850. This amount is so small as to disprove the assumption that any considerable number of the nonresident owners are supported wholly or even mainly from their farms in Massachusetts.

Of the 3,166 rented farms in Massachusetts, 53, worth \$25,000, or over, have an aggregate value of \$2,441,450, and an average value of \$46,065; and 202, worth between \$10,000 and \$25,000 each, have an aggregate value of \$2,847,490, or an average of \$14,096. The remaining 2,911 farms are worth less than \$10,000 each, the average value being \$2,936. The average value of all rented farms in Massachusetts is \$3,595. This low average valuation and the necessarily small average rental received indicate that very few landlords are supported by incomes from rented farms in Massachusetts, and that the number who receive large incomes from that source is insignificant.

FARMS CLASSIFIED BY RACE OF FARMER AND BY TENURE.

Tables 6 and 7 present the principal statistics for farms classified by race of farmer and by tenure.

TABLE 6.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY RACE OF FARMER, AND BY TENURE, WITH PERCENTAGES.

RACE OF FARMER, AND TENURE.	Num-ber of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Aver-age.	Total.	Per cent.	Total.	Per cent.
The State.....	87,715	88.4	3,147,364	100.0	\$182,646,704	100.0
White farmers.....	37,605	83.5	3,141,734	99.8	182,418,032	99.9
Colored farmers <sup>1</sup> .....	110	48.5	5,390	0.2	228,622	0.1
Owners.....	30,646	79.0	2,422,268	77.0	128,453,189	70.3
Part owners.....	1,579	114.2	183,243	5.7	18,178,722	7.2
Owners and tenants.....	856	122.5	43,602	1.4	2,012,569	1.1
Managers.....	1,531	152.9	234,031	7.4	23,101,923	12.7
Cash tenants.....	8,121	68.5	213,670	6.8	18,589,376	7.4
Share tenants.....	482	110.5	58,247	1.7	2,280,926	1.3

<sup>1</sup> Comprising 87 negroes, 22 Indians, and 1 Chinese.

**TABLE 7.—AVERAGE VALUES PER FARM OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY RACE OF FARMER AND BY TENURE.**

RACE OF FARMER, AND TENURE.	AVERAGE VALUES PER FARM OF—					Per cent of gross income on total investment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and im- prove- ments (except build- ings).	Build- ings.	Imple- ments and machin- ery.	Live stock.		
The State.....	\$2,305	\$1,885	\$284	\$419	\$908	18.6
White farmers.....	2,308	1,888	285	420	904	18.6
Colored farmers <sup>1</sup> .....	1,038	805	82	153	415	20.0
Owners.....	1,867	1,787	213	375	817	19.5
Part owners.....	4,786	2,473	400	687	1,860	22.3
Owners and tenants.....	2,888	1,864	362	624	1,872	23.9
Managers.....	8,093	5,363	575	1,058	1,678	11.1
Cash tenants.....	2,417	1,387	173	877	815	18.7
Share tenants.....	2,432	1,592	281	427	952	20.1

<sup>1</sup> Comprising 87 negroes, 22 Indians, and 1 Chinese.

The value of the farm property of colored farmers is \$228,622. Of this amount, \$196,001 represents the farm property of negroes; \$31,420, that of Indians; and \$1,201, that of the 1 Chinese farmer reporting.

Farms conducted by cash tenants have the smallest average area, 68.5 acres, and those of managers, the largest, 152.9 acres. Many of the latter are adjuncts of public institutions, while others are conducted for wealthy individuals in connection with their summer homes. These farms, as a rule, are favorably located and highly improved, and the average values of the various forms of farm property, shown in Table 7, are much larger for this class than for any other class of farms grouped by tenure. The ratio which the gross income of these farms bears to the total value of farm property, however, is smaller than for the other groups. This is due to the high average valuation of the land and buildings, and to the fact that many of these farms are not cultivated for profit.

#### FARMS CLASSIFIED BY AREA.

Tables 8 and 9 give, for farms classified by area, facts corresponding to those shown in Tables 6 and 7 for farms classified by race of farmer and by tenure.

**TABLE 8.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY AREA, WITH PERCENTAGES.**

AREA.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State.....	87,715	83.4	8,147,064	100.0	\$182,646,704	100.0
Under 3 acres.....	951	1.8	1,723	0.1	3,405,662	1.9
3 to 9 acres.....	3,614	6.1	22,116	0.7	10,368,767	5.7
10 to 19 acres.....	4,324	13.9	60,199	1.9	14,697,431	8.0
20 to 49 acres.....	8,875	32.7	290,622	9.2	33,621,208	18.4
50 to 99 acres.....	3,910	69.4	618,783	19.7	41,872,005	22.9
100 to 174 acres.....	6,660	123.9	825,328	26.2	37,198,193	20.4
175 to 259 acres.....	2,533	226.6	323,257	16.6	18,418,088	10.1
260 to 499 acres.....	1,434	381.0	474,676	15.1	14,935,161	8.2
500 to 999 acres.....	889	620.0	210,173	6.7	6,056,255	3.3
1,000 acres and over.....	75	1,603.8	120,287	3.8	2,014,004	1.1

**TABLE 9.—AVERAGE VALUES PER FARM OF SPECIFIED CLASSES OF FARM PROPERTY, AND AVERAGE GROSS INCOME, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY AREA.**

AREA.	AVERAGE VALUES PER FARM OF--					Per cent of gross income on total investment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and improvements (except buildings).	Buildings.	Implementments and machinery.	Live stock.		
The State.....	\$2,305	\$1,885	\$284	\$419	\$908	18.6
Under 3 acres .....	1,587	1,861	105	91	921	25.3
3 to 9 acres .....	1,189	1,420	110	150	495	17.2
10 to 19 acres .....	1,680	1,431	143	195	539	15.9
20 to 49 acres .....	1,752	1,581	181	274	668	17.6
50 to 99 acres .....	2,191	1,833	256	489	883	18.8
100 to 174 acres .....	2,671	2,046	298	570	1,148	20.6
175 to 259 acres .....	3,560	2,539	385	787	1,452	20.0
260 to 499 acres .....	5,373	3,483	518	1,041	1,907	18.3
500 to 999 acres .....	10,186	5,466	667	1,546	2,642	14.8
1,000 acres and over .....	18,721	9,769	1,014	2,359	3,888	14.5

The group of medium-sized farms, containing from 100 to 174 acres each, comprises a larger percentage of the total acreage than any other group. Except for farms of less than 3 acres, the average values of farm property and the average gross incomes given in Table 9 rise in unbroken series. For the group of farms containing less than 3 acres each, the average values are relatively high. This is explained by the fact that this group includes many florists' establishments, and a large number of city dairies. The average gross incomes per acre for the various groups are as follows: Farms under 3 acres, \$508.48; 3 to 9 acres, \$80.83; 10 to 19 acres, \$38.72; 20 to 49 acres, \$20.40; 50 to 99 acres, \$12.71; 100 to 174 acres, \$9.27; 175 to 259 acres, \$7.03; 260 to 499 acres, \$5.76; 500 to 999 acres, \$4.26; and 1,000 acres and over, \$2.42.

In considering the high gross income per acre for farms of less than 3 acres, it should be borne in mind that the incomes of the florists' establishments, nurseries, and city dairies, of which this group is largely composed, are determined, not so much by the acreage of land used, as by the amount of capital invested in buildings, implements, and live stock, and the amounts expended for labor and fertilizers.

#### FARMS CLASSIFIED BY PRINCIPAL SOURCE OF INCOME.

Tables 10 and 11 present the leading features of the statistics relating to farms classified by principal source of income. If for any farm 40 per cent of the products not fed to live stock consists of hay and grain, the farm is designated a hay and grain farm. Should 40 per cent of the products consist of vegetables, the farm is designated a vegetable farm. The farms of the other groups are classified in the same manner. Farms with no income in 1899 are classified according to the agricultural operations upon other farms in the same locality.

TABLE 10.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY PRINCIPAL SOURCE OF INCOME, WITH PERCENTAGES.

PRINCIPAL SOURCE OF INCOME.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State.....	37,715	83.4	3,147,064	100.0	\$182,646,704	100.0
Hay and grain.....	3,284	82.8	270,151	8.6	14,694,851	8.0
Vegetables.....	3,117	43.3	134,838	4.3	18,602,741	10.2
Fruit.....	1,286	66.0	72,002	2.3	5,760,276	3.2
Live stock.....	8,193	63.1	517,036	16.4	26,602,813	14.6
Dairy produce.....	14,900	96.8	1,442,947	45.8	85,193,721	46.6
Tobacco.....	632	71.8	45,855	1.4	3,285,015	1.8
Flowers and plants.....	597	16.4	6,228	0.2	7,729,450	4.2
Nursery products.....	49	43.7	2,141	0.1	483,248	0.3
Miscellaneous.....	5,657	116.0	656,366	20.9	20,294,589	11.1

TABLE 11.—AVERAGE VALUES PER FARM OF SPECIFIED CLASSES OF FARM PROPERTY AND AVERAGE GROSS INCOME, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY PRINCIPAL SOURCE OF INCOME.

PRINCIPAL SOURCE OF INCOME.	AVERAGE VALUES PER FARM OF—					Per cent of gross income on total investment in farm property.
	Farm property, June 1, 1900.				Gross income (products of 1899 not fed to live stock).	
	Land and improvements (except buildings).	Buildings.	Implementments and machinery.	Live stock.		
<i>The State.....</i>	<i>\$2,305</i>	<i>\$1,885</i>	<i>\$234</i>	<i>\$419</i>	<i>\$908</i>	<i>18.6</i>
Hay and grain.....	2,427	1,757	187	154	338	7.4
Vegetables.....	3,415	1,957	305	291	1,132	19.0
Fruit.....	2,520	1,525	208	226	962	21.8
Live stock.....	1,246	1,500	167	334	544	16.7
Dairy produce.....	2,630	2,135	288	620	1,110	19.4
Tobacco.....	2,374	2,107	277	440	1,852	35.6
Flowers and plants.....	8,578	4,085	219	95	2,594	19.6
Nursery products.....	7,043	2,394	320	115	5,127	52.0
Miscellaneous.....	1,408	1,689	223	318	768	21.0

Of the 3,284 "hay and grain" farms, only 1,587 report any domestic animals, and many report no crops except small quantities of hay or grain. These facts explain the relatively small percentage of gross income shown in Table 11 for that group.

The importance of dairying is shown by the fact that 45.8 per cent of the farm land of the state is included in farms devoted wholly or principally to this industry.

For the several classes of farms the average values per acre of the products not fed to live stock are: Flowers and plants, \$242.87; nursery products, \$117.35; vegetables, \$26.17; tobacco, \$25.81; fruit, \$16.99; dairy produce, \$11.46; live stock, \$8.62; miscellaneous, \$3.49; hay and grain, \$4.04. The average gross income per acre for all farm land in the state is \$10.81.

The wide variations in the averages and percentages of gross income, shown for the several classes of farms, are largely due to the fact that in computing gross income no deductions are made for expenditures for labor, fertilizers, and similar items. For florists' establishments and nurseries, the average expenditure for these items represents a far greater percentage of the gross income than in the

case of "hay and grain," "live-stock," or "miscellaneous" farms. Were it possible to present the average net incomes, the variations shown would be comparatively slight.

FARMS CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK.

Tables 12 and 13 present data relating to farms classified by reported value of products not fed to live stock.

TABLE 12.—NUMBER AND ACREAGE OF FARMS, AND VALUE OF FARM PROPERTY, JUNE 1, 1900, CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK, WITH PERCENTAGES.

VALUE OF PRODUCTS NOT FED TO LIVE STOCK.	Number of farms.	NUMBER OF ACRES IN FARMS.			VALUE OF FARM PROPERTY.	
		Average.	Total.	Per cent.	Total.	Per cent.
The State.....	37,715	83.4	3,147,064	100.0	\$182,646,704	100.0
\$0.....	416	60.2	25,023	0.8	1,372,383	0.8
\$1 to \$49.....	1,121	34.9	39,165	1.3	2,285,460	1.2
\$50 to \$99.....	1,914	38.7	73,987	2.4	4,250,693	2.3
\$100 to \$249.....	6,739	44.5	239,943	7.5	17,169,360	9.4
\$250 to \$499.....	8,728	68.2	551,948	17.5	28,443,433	15.6
\$500 to \$999.....	8,782	53.7	821,711	26.1	39,439,780	21.6
\$1,000 to \$2,499.....	7,615	122.2	913,076	29.2	51,531,184	28.2
\$2,500 and over.....	2,600	166.7	416,811	13.2	38,151,770	20.9

TABLE 13.—AVERAGE VALUES PER FARM OF SPECIFIED CLASSES OF FARM PROPERTY AND AVERAGE GROSS INCOME, WITH PER CENT OF GROSS INCOME ON TOTAL INVESTMENT IN FARM PROPERTY, CLASSIFIED BY REPORTED VALUE OF PRODUCTS NOT FED TO LIVE STOCK.

VALUE OF PRODUCTS NOT FED TO LIVE STOCK.	AVERAGE VALUES PER FARM OF—					Per cent of gross income on total invest- ment in farm property.
	Farm property, June 1, 1900.					
	Land and im- prove- ments (except build- ings).	Build- ings.	Imple- ments and machin- ery.	Live stock.	Gross income (products of 1899 not fed to live stock).	
The State	\$2,305	\$1,885	\$234	\$419	\$903	18.6
\$0	2,028	1,086	23	162		
\$1 to \$49	996	901	70	72	38	1.9
\$50 to \$99	1,059	999	71	92	80	3.6
\$100 to \$249	1,144	1,166	100	133	172	6.8
\$250 to \$499	1,612	1,249	151	247	359	11.0
\$500 to \$999	1,981	1,888	229	396	709	15.8
\$1,000 to \$2,499	3,042	2,783	351	723	1,546	22.6
\$2,500 and over	8,358	4,737	788	1,378	4,679	30.7

Of the farms of the state, 416, ranging in area from less than 3 to over 1,000 acres, report no income. The average values of the land and improvements, buildings, and live stock of these farms are very high. This, together with the fact that 339 of them are operated by their owners, indicates that many of them are summer homes or country estates, held for pleasure and not for profit. Many of the 1,121 farms with reported incomes of less than \$50 each probably belong to the same class, the only crops raised having been for home consumption. Some, however, are farms that were partially abandoned in 1899, while others had changed owners or tenants, and the farmers in charge, June 1, 1900, were unable to give definite information concerning the products of the pre-

ceeding year. To this extent the reports fall short of giving a complete exhibit of farm income in 1899.

#### LIVE STOCK.

At the request of the various live-stock associations of the country, a new classification of domestic animals was adopted for the census of 1900. Neat cattle are grouped by age, in accordance with their present and prospective relations to the dairy industry and the supply of meat products. Horses and mules are classified by age, and neat cattle and sheep by age and sex. The new classification permits a very close comparison with the figures published in previous census reports.

Table 14 presents a summary of live-stock statistics.

TABLE 14.—NUMBER OF DOMESTIC ANIMALS, FOWLS, AND BEES ON FARMS, JUNE 1, 1900, WITH TOTAL AND AVERAGE VALUES, AND NUMBER OF DOMESTIC ANIMALS NOT ON FARMS.

LIVE STOCK.	Age, in years.	ON FARMS.			Not on farms.
		Number.	Value.	Average value.	
Calves	Under 1	43,621	\$357,542	\$8.20	1,405
Steers	1 and under 2	2,476	38,893	15.71	136
Steers	2 and under 3	1,735	47,029	27.11	50
Steers	3 and over	1,943	105,786	54.44	116
Bulls	1 and over	7,209	185,543	25.74	57
Heifers	1 and under 2	84,452	587,080	17.01	1,280
Cows kept for milk	2 and over	184,502	6,546,954	35.47	14,890
Cows and heifers not kept for milk.	2 and over	9,946	262,090	26.35	517
Colts	Under 1	799	47,177	59.05	141
Horses	1 and under 2	2,298	160,121	69.68	219
Horses	2 and over	71,937	5,619,159	78.11	138,269
Mule colts	Under 1	57	2,280	39.65	4
Mules	1 and under 2	27	1,480	54.81	2
Mules	2 and over	214	16,945	79.18	484
Asses and burros	All ages	51	1,709	33.51	55
Lambs	Under 1	18,090	51,520	2.76	617
Sheep (ewes)	1 and over	30,441	125,357	4.12	1,845
Sheep (rams and wethers).	1 and over	3,428	16,719	4.88	297
Swine	All ages	78,925	549,617	6.96	17,219
Goats	All ages	1,254	7,188	5.73	493
Fowls: <sup>1</sup>					
Chickens <sup>2</sup>		1,625,269			
Turkeys		3,018			
Geese		6,389			
Ducks		46,017			
Bees (swarms of)		8,381	85,751	4.27	
Unclassified			14,425		
Value of all live stock.			15,798,464		

<sup>1</sup> The number reported is of fowls over 3 months old. The value is of all, old and young.

<sup>2</sup> Including Guinea fowls.

The total value of all live stock on farms, June 1, 1900, was \$15,798,464, of which 36.9 per cent represents the value of horses; 41.4 per cent, the value of dairy cows; 10.0 per cent, that of other neat cattle; 6.5 per cent, that of poultry; and 5.2 per cent, that of all other live stock.

The average value of steers 3 years old and over is comparatively high, as this class includes the valuable working oxen still used in some districts of the state. The number so employed is rapidly decreasing. In 1850, 46,611 working oxen were reported; in 1860, 38,221; in 1870, 24,430; in 1880, 14,571; in 1890, 9,831; while in 1900, the total number of steers over 2 years old was only 3,678, and it is probable that many of these were not working oxen.

No reports were secured of the value of live stock not on farms, but it is probable that such animals have higher average values than those on farms. Allowing the same

averages, however, the total value of the domestic animals not on farms is \$11,190,600, an amount only 29.1 per cent less than the total value of farm live stock. The number of horses used in agricultural operations is but little more than half the number employed in towns and cities. Exclusive of poultry and bees not on farms, the total value of live stock in the state is approximately \$26,974,039.

#### CHANGES IN LIVE STOCK KEPT ON FARMS.

The following table shows the changes since 1850 in the numbers of the most important domestic animals:

TABLE 15.—NUMBER OF SPECIFIED DOMESTIC ANIMALS ON FARMS: 1850 TO 1900.

YEAR.	Dairy cows.	Other neat cattle.	Horses.	Mules and asses.	Sheep. <sup>1</sup>	Swine.
1900	184,562	101,882	75,034	349	33,869	78,925
1890	172,046	84,082	68,638	196	51,438	91,488
1880	150,435	110,616	59,629	243	87,979	80,123
1870	114,771	104,281	41,039	103	78,560	49,178
1860	144,492	185,422	47,786	108	114,829	78,948
1850	130,099	129,895	42,216	34	188,651	81,119

<sup>1</sup> Lambs not included.

The development of intensive agriculture in Massachusetts has been attended by important changes in the general character of live stock kept on farms.

The remarkable growth of dairying is shown by the constantly increasing number of dairy cows, while the gradual transfer of labor and capital from general farming to horticulture and market gardening has necessitated the introduction of much new and improved machinery, and consequently more horsepower. The decline in the raising of sheep and beef cattle is incident to the shifting of the meat-producing industry to the Western states.

The number of dairy cows, June 1, 1900, was 41.9 per cent greater than in 1850, and 7.3 per cent greater than in 1890. The number of "other neat cattle" in 1900 includes 43,621 calves. As it is uncertain whether any calves were reported under this head in 1890, the increase shown for the last decade in the number of "other neat cattle" may be wholly apparent. The number of horses is 77.7 per cent greater than in 1850 and 17.9 per cent greater than in 1890. Sheep have decreased in number 82.0 per cent since 1850, and 34.2 per cent in the last decade. The number of swine has fluctuated from decade to decade but has not changed materially since 1850. There was a decrease of 13.7 per cent between 1890 and 1900.

In comparing the poultry report of 1900 (see Table 14) with that of the Eleventh Census, it should be borne in mind that in 1900 the enumerators were instructed not to report fowls less than 3 months old, while in 1890 no such limitation was made. This fact explains, to a great extent, the decrease in number of turkeys, ducks, and geese, and the very slight increase in the number of chickens. Compared with the figures for 1890, the present census shows decreases in the number of fowls as follows: Turkeys, 48.0 per cent; ducks, 34.8 per cent; and geese, 23.7 per cent.



## ANIMAL PRODUCTS.

Table 16 is a summarized exhibit of the products of the animal industry.

TABLE 16.—QUANTITIES AND VALUES OF SPECIFIED ANIMAL PRODUCTS, AND VALUES OF POULTRY RAISED, ANIMALS SOLD, AND ANIMALS SLAUGHTERED ON FARMS IN 1899.

PRODUCTS.	Unit of measure.	Quantity.	Value.
Wool	Pounds	195,876	\$40,291
Mohair and goat hair	Pounds	1,120	896
Milk	Gallons	105,571,873	12,885,744
Butter	Pounds	4,980,202	2,571,341
Cheese	Pounds	19,623	1,407,681
Eggs	Dozens	12,928,630	18,412
Poultry			1,284,454
Honey	Pounds	109,050	682,411
Wax	Pounds	6,250	
Animals sold			
Animals slaughtered			
Total			19,140,730

The value of animal products in 1899 was \$19,140,730, or 45.8 per cent of the value of all farm products, and 56.2 per cent of the gross farm income. Of the total value given, 67.3 per cent represents the value of dairy products; 20.8 per cent, that of poultry raised and eggs produced; 11.6 per cent, that of animals sold and slaughtered on farms; and 0.3 per cent, that of wool, mohair, honey, and wax.

## DAIRY PRODUCE.

In no other branch of agriculture in Massachusetts has there been such constant and rapid development as in dairying. Its importance is shown by the fact that in 1899 the proprietors of 14,900 farms, or 39.5 per cent of the total number, derived their principal income from this source, while the total value of all dairy produce constituted 67.3 per cent of the value of all animal products, and 37.9 per cent of the gross farm income. The production of milk in 1899 was 22,999,949 gallons greater than in 1889, a gain of 27.9 per cent. As the number of dairy cows increased but 7.3 per cent in the same period, the increased production of milk is evidence that the dairy-men are not only keeping better cows but are paying more attention to the care of their herds than ten years ago.

Decreases since 1889 of 40.4 per cent in the quantity of butter and of 84.0 per cent in the quantity of cheese produced on farms are significant indications of change in the general character of the dairy industry. Increasing quantities of butter and cheese are made in creameries and cheese factories. This fact, and the increased consumption of milk and cream in cities, account for the change.

Of the \$12,885,744, given in Table 16 as the value of all dairy products in 1899, \$1,416,960, or 11.0 per cent, represents the value of such products consumed on farms, and \$11,468,784, or 89.0 per cent, the amount realized from dairy produce sold. Of the latter amount, \$9,711,380 was derived from the sale of 68,180,759 gallons of milk; \$884,575, from 3,684,696 pounds of butter; \$870,833,

from 2,315,745 gallons of cream; and \$1,996, from 15,138 pounds of cheese.

## POULTRY AND EGGS.

The total value of the products of the poultry industry in 1899 was \$3,979,022, of which amount 35.4 per cent represents the value of fowls raised, and 64.6 per cent, that of eggs produced. Nearly 4,000,000 dozen more eggs were produced in 1899 than ten years before, the per cent of increase being 44.8.

## WOOL.

The production of wool has decreased steadily for half a century, and the clip of 1899 was about one-third as large as that of 1849. The decrease in the last decade was 45,438 pounds, or 18.8 per cent. The average weight of fleeces, however, increased from 4.4 pounds in 1879 to 5.6 pounds in 1899, indicating an improvement in the grade of sheep kept. Sheep raising in Massachusetts is now largely confined to the four western counties and the islands off the Atlantic coast.

## HONEY AND WAX.

The quantity of honey produced in 1899 was 109,050 pounds, a gain of 18,121 pounds, or 19.9 per cent, over the production of 1889. The quantity of wax reported in 1889 was only 1,690 pounds while in 1899, 6,250 pounds were produced.

## HORSES AND DAIRY COWS ON SPECIFIED CLASSES OF FARMS.

Table 17 presents, for the leading groups of farms, the number of farms reporting horses and dairy cows, the total number of these animals and the average number per farm. In computing the averages presented, only those farms which report the kind of stock under consideration are included.

TABLE 17.—HORSES AND DAIRY COWS ON SPECIFIED CLASSES OF FARMS, JUNE 1, 1900.

CLASSES.	HORSES.			DAIRY COWS.		
	Farms reporting.	Number.	Average per farm.	Farms reporting.	Number.	Average per farm.
Total	31,444	75,034	2.4	28,162	184,562	6.6
White farmers	31,864	74,901	2.4	28,105	184,403	6.6
Colored farmers	80	133	1.7	57	159	2.8
Owners <sup>1</sup>	27,248	62,873	2.3	24,489	152,405	6.2
Managers	1,228	5,345	4.4	1,144	12,972	11.3
Cash tenants	2,592	5,859	2.3	2,194	16,615	7.6
Share tenants	876	957	2.5	335	2,570	7.7
Under 20 acres	6,096	9,587	1.6	4,473	12,807	2.9
20 to 99 acres	15,274	32,431	2.1	13,933	67,633	4.9
100 to 174 acres	6,040	17,112	2.8	5,826	49,861	8.6
175 to 259 acres	2,331	7,882	3.4	2,266	27,795	12.3
260 acres and over	1,703	8,022	4.7	1,664	26,416	15.9
Hay and grain	1,463	3,596	2.5	791	2,506	3.2
Vegetable	2,680	6,347	2.4	1,685	5,592	3.3
Fruit	894	1,840	2.1	517	1,840	2.6
Live stock	6,962	13,456	1.9	5,419	17,811	3.3
Dairy	18,868	86,924	2.7	14,900	150,999	9.2
Tobacco	576	1,073	2.9	502	2,621	5.2
Miscellaneous <sup>2</sup>	5,001	11,198	2.2	4,848	17,693	4.1

<sup>1</sup> Including "part owners" and "owners and tenants."

<sup>2</sup> Including florists' establishments and nurseries.



## CROPS.

The following table presents the statistics of the principal crops of 1899:

TABLE 18.—ACREAGES, QUANTITIES, AND VALUES OF THE PRINCIPAL FARM CROPS IN 1899.

PRODUCTS.	Acres.	Unit of measure.	Quantity.	Value.
Corn	89,181	Bushels	1,539,980	\$771,277
Wheat	95	Bushels	1,750	1,515
Oats	6,702	Bushels	240,930	84,850
Barley	688	Bushels	14,987	9,264
Rye	4,557	Bushels	60,284	84,291
Buckwheat	2,262	Bushels	86,084	20,930
Clover seed		Bushels	1	6
Grass seed		Bushels	166	581
Hay and forage	610,023	Tons	856,505	9,056,854
Tobacco	3,527	Pounds	6,406,570	956,399
Dry beans	929	Bushels	7,939	15,088
Dry pease	122	Bushels	2,259	2,125
Potatoes	27,521	Bushels	3,346,590	1,800,937
Sweet potatoes	( <sup>1</sup> )	Bushels	23	11
Onions	1,670	Bushels	748,809	832,653
Miscellaneous vegetables	28,109			3,412,995
Maple sugar		Pounds	192,990	21,124
Maple sirup		Gallons	27,174	27,112
Small fruits	8,346			1,499,714
Grapes <sup>2</sup>	159	Centals	13,083	35,635
Orchard fruits <sup>2</sup>	57,208	Bushels	3,153,781	*1,170,863
Nuts				12,106
Forest products				1,944,714
Flowers and plants	584			1,639,760
Seeds	70			40,652
Nursery products	894			260,069
Hoys	18	Pounds	7,480	736
Broom corn	11	Pounds	7,050	357
Peanuts	( <sup>1</sup> )	Bushels	3	6
Miscellaneous				11,325
Total	792,681			23,157,544

<sup>1</sup> Less than 1 acre.

<sup>2</sup> Estimated from number of vines or trees.

<sup>3</sup> Including the value of wine, raisins, etc.

<sup>4</sup> Including the value of cider and vinegar.

Of the total value of the crops of 1899, hay and forage contributed 39.1 per cent; vegetables, including potatoes, sweet potatoes, and onions, 23.9 per cent; fruits and nuts, 11.7 per cent; forest products, 8.4 per cent; flowers and plants, 7.1 per cent; cereals, 4.0 per cent; and other crops, 5.8 per cent.

The average value per acre of the various crops was as follows: Flowers and plants, \$2,807.81; nursery products, \$290.90; tobacco, \$249.91; onions, \$199.01; miscellaneous vegetables, \$121.42; potatoes, \$65.44; cereals, \$17.27; hay and forage, \$14.85; orchard fruits, \$20.45; and small fruits, \$178.97. The crops yielding the highest average returns per acre were grown upon very highly improved land. Their production required a large amount of labor and the greatest relative expenditure for fertilizers.

## HAY AND FORAGE.

The acreage and production of hay and forage reported by the Tenth, Eleventh, and Twelfth censuses are, respectively, 639,498 acres and 684,679 tons; 627,385 acres and 793,167 tons; 610,023 acres and 856,505 tons. These figures show that a constant decrease in acreage has been attended by a steady increase in production. The yield per acre in 1879 was 1.07 tons; in 1889, 1.26 tons; and in 1899, 1.40 tons. The poorest land is being gradually abandoned and an increasing portion of the more fertile soil is being devoted to the cultivation of corn, nonsaccharine sorghum, and similar crops used for forage and ensilage. In 1899, 23,635 acres of such crops, yielding 174,904 tons, were reported. The high yield per acre, 7.4

tons, was an important factor in raising the average yield of hay and forage in 1899 above that of 1889.

## CEREALS.

Table 19 is an exhibit of the changes in cereal production since 1849.

TABLE 19.—ACREAGE AND PRODUCTION OF CEREALS: 1849 TO 1899.

PART 1.—ACREAGE.						
YEAR. <sup>1</sup>	Barley.	Buckwheat.	Corn.	Oats.	Rye.	Wheat.
1899	688	2,262	89,181	6,702	4,557	95
1889	1,785	2,478	34,010	14,331	10,665	112
1879	3,171	5,617	52,555	20,659	21,666	968
PART 2.—BUSHELS PRODUCED.						
1899	14,987	86,084	1,539,980	240,930	60,294	1,750
1889	33,715	81,800	1,330,101	833,819	117,091	1,813
1879	80,128	67,117	1,797,768	845,150	213,716	15,738
1869	133,071	58,049	1,397,807	797,664	239,227	34,648
1859	134,891	123,202	2,157,063	1,180,075	388,085	119,733
1849	112,385	105,895	2,845,480	1,165,146	481,021	31,212

<sup>1</sup> No statistics of acreage were secured prior to 1879.

Of the many changes in New England agriculture, none has attracted more general attention than the decrease in cereal production. No other fact, perhaps, is so largely responsible for the popular notion that agriculture is declining in the Eastern states. A careful study of the tables of this bulletin shows that the farmers of Massachusetts are turning from general farming, and from cereal production in particular, to dairying, poultry raising, market gardening, and fruit growing. This movement is the result, on the one hand, of western competition and the development of transportation facilities, and, on the other hand, of the demands of a rapidly increasing urban population for the products of the special industries mentioned.

Since 1879 the total area devoted to cereals has decreased from 104,631 acres to 53,385 acres, the percentages of decrease for the various grains being as follows: Barley, 79.9; buckwheat, 59.7; corn, 25.5; oats, 67.6; rye, 79.0; and wheat, 90.1. The decrease was most marked in the last decade, in which period the total area devoted to all cereals except corn, decreased in every county. In the western counties, which are best suited to cereals, the decrease was comparatively slight. Consequently, these counties had, in 1899, a greater percentage than in 1889 of the total acreage devoted to cereals other than corn. In 1899, Berkshire, Franklin, Hampden, and Hampshire counties produced 58.5 per cent of the barley raised in the state, 92.7 per cent of the buckwheat, 57.0 per cent of the corn, 83.7 per cent of the oats, 84.5 per cent of the rye, and 42.3 per cent of the wheat.

The second part of the table shows that larger crops of corn and rye were grown in 1849 than in any succeeding census year, and that 1859 was the record year in the production of barley, buckwheat, oats, and wheat. With a few exceptions, the decline from the high point has been continuous, but most marked since 1879. Corn, however,

furnishes an important exception to the general rule. The increase in its production during the last decade is believed to be closely related to the recent growth in dairying. This view is sustained by the fact that the counties having the largest increases in the number of dairy cows report, as a rule, the largest gains in the acreage devoted to corn. The increase in the production of buckwheat in the last decade is due to a more favorable year in 1899, the acreage having decreased.

#### ORCHARD FRUITS.

The changes in orchard fruits since 1890 are shown in the following table:

TABLE 20.—ORCHARD TREES AND FRUITS: 1890 AND 1900.

FRUITS.	NUMBER OF TREES.		BUSHELS OF FRUIT.	
	1900	1890	1899	1889
Apples.....	1,852,046	1,607,551	3,023,436	1,690,110
Apricots.....	481	403	25	16
Cherries.....	17,258	14,495	6,043	2,413
Peaches.....	301,405	87,004	27,906	7,472
Pears.....	148,503	136,348	39,011	71,559
Plums and prunes.....	49,452	17,206	5,919	2,186

The value of the orchard products of 1899 was \$1,170,868. The counties whose orchard products were valued at more than \$100,000 are as follows: Middlesex, \$245,306; Worcester, \$237,962; Franklin, \$134,675; Berkshire, \$116,290; Essex, \$110,720; and Hampshire, \$102,988. Nantucket county reported no fruit trees.

In 1890, 86.9 per cent, and in 1900, 78.2 per cent of all fruit trees in the state were apple trees. All of the leading fruit-growing counties, except Berkshire and Hampden, reported more apple trees in 1900 than ten years before, the increase for the state being 9.1 per cent.

The most notable gain during the last decade was in the number of peach trees, which increased from 87,004 to 301,405, or 246.4 per cent. Worcester and Middlesex counties have about two-thirds of the total number reported. The number of cherry trees increased 19.1 per cent; pear trees, 8.9 per cent; and plum and prune trees, 185.9 per cent. In addition to those given in Table 20, there were reported in 1900, 7,895 unclassified fruit trees, and 6,441 bushels of fruit. There were manufactured on farms in 1899, 35,366 barrels of cider, 4,301 barrels of vinegar, and 7,530 pounds of dried fruit.

The quantity of fruit produced in any given year is determined largely by the nature of the season. Comparisons between the crops of 1889 and 1899 have little significance, because the latter season was unusually favorable, nearly twice as much fruit having been reported as in 1889.

#### VEGETABLES AND SMALL FRUITS.

The value of all vegetables produced in the state in 1899, including potatoes, sweet potatoes, and onions, was \$5,546,296, of which 32.5 per cent represents the value of potatoes. Aside from the land devoted to potatoes, sweet potatoes, and onions, 28,109 acres were used in growing miscellaneous vegetables. Of this area the products of

11,098 acres were not reported in detail. Of the 17,011 acres which were fully reported, 5,493 acres were devoted to sweet corn; 3,245, to cabbages; 1,645, to tomatoes; 995, to asparagus; 920, to squashes; and 4,713, to other vegetables.

The total area used in growing small fruits was 8,346 acres, and the value of the fruit produced was \$1,493,714, an average of \$179 per acre. Of the total area, 5,125 acres, or 61.4 per cent, were devoted to cranberries. They are grown very extensively in Barnstable and Plymouth counties. In 1899 these counties reported 4,458 acres, or 87.0 per cent of the entire acreage, and 543,003 bushels of cranberries, or 90.7 per cent of the total crop. The average yield per acre for these 2 counties was 121.8 bushels, while for the remainder of the state it was but 83.8 bushels. The total production for the state was 598,906 bushels.

The acreage and production of other berries were as follows: Blackberries and dewberries, 365 acres and 522,860 quarts; currants, 190 acres and 255,580 quarts; gooseberries, 32 acres and 46,390 quarts; raspberries and Logan berries, 413 acres and 558,010 quarts; strawberries, 2,027 acres and 4,997,240 quarts. Of unclassified berries 337,300 quarts from 194 acres were reported. The production of all berries was 25,882,372 quarts.

Grapes were grown in 1899 by 4,902 farmers who obtained 13,083 centals of fruit from 79,639 vines. The total value of the grape crop, including the value of 10,266 gallons of wine made therefrom, was \$35,685.

#### TOBACCO.

Tobacco has been grown as a regular crop in Massachusetts from the earliest colonial days, but no statistics concerning its acreage or production were published prior to 1840. In that year, 64,955 pounds were grown on an estimated area of 40 acres. From this date until the close of the Civil War the production increased rapidly, the state census of 1865 having reported 5,617.5 acres and 9,361,641 pounds. The census of 1870 showed a decided falling off from these figures, and the decline which began at that time continued until 1890, when a product of 2,794,858 pounds was secured from 2,012 acres. The effect of better prices and a growing demand for light tobaccos were reflected in the figures of the state census of 1895, which reported 3,104 acres and 4,967,096 pounds. The present census shows that in 1899 tobacco was grown by 1,009 farmers, who obtained a yield of 6,406,570 pounds from 3,827 acres, a gain in ten years of 129.2 per cent in production and 90.2 per cent in acreage. The average yield per acre was 1,674 pounds, while in 1889 it was but 1,389 pounds. The total value of the crop was \$956,399, an average of \$947.87 for each farm reporting.

The cultivation of tobacco in Massachusetts is confined almost entirely to the valley of the Connecticut River, which flows through Hampden, Hampshire, and Franklin counties. In 1899 these 3 counties produced 99.6 per cent of the total crop. Of the remaining area, Berkshire county reported 22 acres, and Bristol and Worcester counties, 1 acre each.

## FOREST PRODUCTS.

The term "forest products" includes logs, telegraph poles, railroad ties, cord wood, hoops and staves, fence posts, bark, resin, and similar materials cut or produced on farms. The value of such products in 1899 was \$1,944,714, reported by 16,832 farmers. The large income derived from this source is noteworthy, for the reason that a considerable portion of it was from conserved forestry or from trees cultivated on otherwise waste land. The planting of trees for future revenue began in the state as early as 1740, and in more recent years has been practiced on a large scale under the direction of the Massachusetts Forestry Association. The fact that the income which farmers derived from forest products in 1899 is larger than that reported by any preceding census, emphasizes the value of a judicious conservation of the natural resources in forestry.

## FLORICULTURE.

Massachusetts is one of the leading states in the production and sale of flowers and foliage plants. In 1899 the total value of the products of this industry was \$1,639,760, reported by the operators of 734 establishments.

Of this number 597 are commercial florists, depending upon the sale of floral products for the greater part of their income. They had a capital of \$7,690,675 invested in land, buildings, and implements, of which amount \$5,121,133 represents the value of 6,228 acres of land. The high valuation of this land, \$822 per acre, is due to the fact that it comprises many small tracts situated within or adjacent to city limits. The reported value of buildings was \$2,438,965, and of implements, \$130,577. Under the head of expenditures, \$398,805 was reported for labor, and \$35,844 for fertilizers. The total gross income of these commercial florists was \$1,512,581, of which \$1,436,188 was derived from the sale of flowers and plants, and \$76,393 from other products.

Of the total area of 8,710,280 square feet of land under glass, 4,486,106 square feet, equivalent to 5,981,475 square feet of glass surface, were reported by the 597 florists.

The remaining 4,224,174 square feet were reported by 955 farmers and market gardeners engaged in growing early vegetables for the city markets. Most of the truck farms, whose operators report the use of glass, are located in Middlesex county, which supplies a large proportion of the vegetables sold in the Boston markets.

## NURSERIES.

The total value of nursery stock sold in 1899 was \$260,069, reported by the operators of 168 farms and nurseries. Of this number, 49 derive their principal income from the nursery business. They had 2,141 acres of land, valued at \$344,605; buildings worth \$117,318; and implements and machinery valued at \$15,685. Their total gross income was \$251,239, of which \$227,764 was derived from the sale of trees, shrubs, and vines, and \$23,475, from the sale of other farm products. The average gross income per acre was \$117.85.

## LABOR AND FERTILIZERS.

The total expenditure for labor on farms in 1899, including the value of board furnished, was \$7,487,280, an average of \$199 per farm. The average was highest on the most intensively cultivated farms, having been \$1,086 for nurseries, \$668 for florists' establishments, \$375 for fruit farms, \$340 for market gardens, \$302 for tobacco farms, and \$231 for dairies, while for hay and grain farms, the average was but \$98, and for live-stock farms, but \$86. Managers expended, on an average, \$730; owners, \$164; cash tenants, \$140; and share tenants, \$167. White farmers expended \$199, and colored farmers, \$53 per farm.

Fertilizers purchased in 1899 cost \$1,320,600, an average of \$35 per farm, and an increase since 1890 of 47.3 per cent. The average expenditure was greatest for tobacco farms and least for hay and grain farms, the amounts being \$227 and \$12, respectively. For nurseries the average was \$189; for vegetable farms, \$76; for florists' establishments, \$60; for dairy farms, \$37; for fruit farms, \$30; and for live-stock farms, \$14.

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## MANUFACTURES.

### TURPENTINE AND ROSIN.

Hon. WILLIAM R. MERRIAM,  
*Director of the Census.*

SIR: I transmit herewith, for publication in bulletin form, a report on the manufacture of spirits of turpentine and rosin, prepared under my direction by Mr. William M. Steuart, chief of the division of manufactures, Census Office.

The statistics included in the report were collected, as in previous censuses, upon the schedule used for the general statistics of manufactures. But owing to the distinctive character of the industry, and its comparative importance in a large section of the South, it was decided to supplement the canvass made by the enumerators and local special agents by a special investigation of the peculiar features and conditions pertaining to the manufacture of these products.

Although the production of spirits of turpentine and rosin has been treated as manufacturing at all census periods, a large part of the work necessary in the industry might more properly be otherwise classified. The boxing of the trees and the gathering of the crude gum are processes analogous to those industries by which forest products are made available as raw material for industries engaged in the utilization of such products and, if it were possible, this branch of the industry should be separated for census purposes from the operations of the distillery plants which manufacture the spirits of turpentine and rosin from the crude turpentine. So closely allied, however, are the several branches of the industry—by far the larger proportion of establishments engaged in it performing all parts of the work—that it has been found impossible to eliminate the capital and expenses pertaining to the forest work so as to obtain statistics relating exclusively to the operations of the distilleries.

The statistics are presented in 7 tables: Table 1 showing comparative figures for the industry at the several censuses; Table 2 showing the quantities of naval stores exported during each year from 1850 to 1900; Table 3

showing, by states and for the United States, a summary of the principal items of information for 1900; Table 4 showing the total quantity of spirits of turpentine, crude turpentine and rosin, and tar and pitch exported from the ports of each state at ten-year periods from 1860 to 1900, inclusive; Table 5 showing statistics of receipts, 1896 to 1901, inclusive, at the principal ports engaged in buying and selling turpentine and rosin; Table 6 showing, by states, the total quantity of crude gum gathered, the quantity and value of spirits of turpentine and rosin, and the average value per barrel of each in 1900; and Table 7 showing, by states, the detailed statistics for the industry in 1900.

Tables 2 and 4, as stated in the text of the report, have been compiled from the several reports of the Bureau of Statistics of the Treasury Department, and are interesting as showing the development of the industry. Table 5 has been compiled from the reports of the boards of trade and similar bodies of the cities included in the table.

Table 1 shows the growth of the industry for the half century which terminates with the Twelfth Census. The manufacturing statistics of the censuses prior to 1850 were too imperfect and fragmentary in character to make it proper to reproduce them in such a table as a measure of industrial growth in the first half of the century. Owing to changes in the method of taking the census, comparisons between the earlier and later decades, represented in Table 1, should be drawn only in the most general way. Nevertheless, the rate of growth in the manufacture of turpentine and rosin may be fairly inferred from the figures given. No attempt was made, prior to the Twelfth Census, to ascertain in detail any special statistical data as to the quantity of crude gum used and spirits of turpentine and rosin manufactured, and it is therefore impossible to make a comparison of these items of information with the results presented in the reports of any previous census.

In drafting the schedules of inquiry for the census of

1900 care was taken to preserve the basis of comparison with prior censuses. Comparison may be made safely with respect to all the items of inquiry except those relating to capital, salaried officials, clerks, etc., and their salaries, the average number of employees, and the total amount of wages paid. Live capital, that is, cash on hand, bills receivable, unsettled ledger accounts, raw materials, stock in process of manufacture, finished products on hand, and other sundries, was first called for at the census of 1890. No definite attempt was made, prior to the census of 1890, to secure a return of live capital invested.

Changes were made in the inquiries relating to employees and wages in order to eliminate defects found to exist on the form of inquiry adopted in 1890. At the census of 1890 the average number of persons employed during the entire year was called for, and also the average number employed at stated weekly rates of pay, and the average number was computed for the actual time the establishments were reported as being in operation. At the census of 1900 the greatest and least numbers of employees were reported, and also the average number employed during each month of the year. The average number of wage-earners (men, women, and children) employed during the entire year was ascertained by using 12, the number of calendar months, as a divisor into the total of the average numbers reported for each month. This difference in the method of ascertaining the average number of wage-earners during the entire year may have resulted in a variation in the number, and should be considered in making comparisons.

At the census of 1890 the number and salaries of proprietors and firm members actively engaged in the business or in supervision were reported, combined with clerks and other officials. In cases where proprietors and firm members were reported without salaries, the amount that would ordinarily be paid for similar services was estimated. At the census of 1900 only the number of proprietors and firm members actively engaged in the industry or in supervision was ascertained, and no salaries were reported for this class. It is therefore impossible to compare the num-

ber and salaries of salaried officials of any character for the two censuses.

Furthermore, the schedules for 1890 included in the wage-earning class, overseers, foremen, and superintendents (not general superintendents or managers), while the census of 1900 separates from the wage-earning class such salaried employees as general superintendents, clerks, and salesmen. It is possible and probable that this change in the form of the question has resulted in eliminating from the wage-earners, as reported by the present census, many high-salaried employees included in that group for the census of 1890.

The reports show a capital of \$11,847,495 invested in the manufacture of spirits of turpentine and rosin in the 1,503 establishments reporting for the country. This sum represents the value of land, buildings, machinery, tools, and implements, and the live capital utilized, but does not include the capital stock of any of the manufacturing corporations engaged in this industry. The value of the products is returned at \$20,344,888, to produce which involved an outlay of \$778,694 for salaries of officials, clerks, etc.; \$8,393,483 for wages; \$476,171 for miscellaneous expenses, including rent, taxes, etc.; and \$6,186,492 for materials used, mill supplies, freight, and fuel. It is not to be assumed, however, that the difference between the aggregate of these sums and the value of the products is, in any sense, indicative of the profits in the manufacture of spirits of turpentine and rosin during the census year. The census schedule takes no cognizance of the cost of selling manufactured articles, or of interest on capital invested, or of the mercantile losses incurred in the business, or of depreciation in plant. The value of the product given is the value as obtained or fixed at the works. This statement is necessary in order to avoid erroneous conclusions from the figures presented.

Very respectfully,



*Chief Statistician for Manufactures.*

# TURPENTINE AND ROSIN.

By WILLIAM M. STEUART.

The gathering of resin, or crude turpentine, from the longleaf pine was among the first industries to attract the attention of the early settlers of the territory now forming the state of North Carolina. The primitive methods of gathering and shipping the resin as a raw material were followed by the manufacture of tar and pitch and the distillation of spirits of turpentine, the residuum being sold as rosin. The turpentine industry has extended to other

sections, and is now found in all regions in which the longleaf pine is found in sufficient abundance, and has formed an important feature in the industrial development of the South Atlantic and Eastern Gulf states. Table 1 is a comparative summary of the statistics for the industry as returned at the censuses of 1850 to 1900, with the percentages of increase for each decade.

TABLE 1.—COMPARATIVE SUMMARY, 1850 TO 1900, WITH PER CENT OF INCREASE FOR EACH DECADE.

	DATE OF CENSUS.						PER CENT OF INCREASE.				
	1900	1890	1880	1870	1860	1850	1800 to 1900	1880 to 1890	1870 to 1880	1860 to 1870	1850 to 1860
Number of establishments	1,508	670	508	227	625	856	124.8	81.9	123.8	163.7	127.0
Capital	\$11,847,435	\$4,062,375	\$1,866,890	\$902,225	\$4,013,753	\$1,668,692	191.8	117.7	100.0	177.5	141.3
Salaries officials, clerks, etc., number	1,889	249	( <sup>1</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	( <sup>4</sup> )	3755.1				
Salaries	\$778,694	\$26,944	( <sup>1</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	( <sup>4</sup> )	2790.0				
Wage-earners, average number	41,884	15,266	10,585	2,638	4,214	8,487	174.2	44.9	290.4	137.4	22.6
Total wages	\$8,393,483	\$2,905,647	\$1,028,061	\$476,294	\$770,696	\$147,346	188.8	79.1	240.8	188.2	72.8
Men, 16 years and over	41,875	15,031	9,855	2,626	4,079	8,369	178.8	61.0	294.1	188.1	21.1
Wages	\$8,338,044	\$2,801,502	( <sup>1</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	( <sup>4</sup> )	188.4				
Women, 16 years and over	73	211	( <sup>1</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	( <sup>4</sup> )	22.7	58.3	87.5	140.0	98.5
Wages	\$21,630	\$10,314	( <sup>1</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	( <sup>4</sup> )	109.1				
Children, under 16 years	816	94	242	( <sup>1</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	236.2	61.2	680.6		
Wages	\$33,809	\$4,811	( <sup>1</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	( <sup>4</sup> )	692.7				
Miscellaneous expenses	\$476,171	\$178,662	( <sup>1</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	( <sup>4</sup> )	186.5				
Cost of materials used	\$6,186,492	\$2,874,693	\$2,324,637	\$2,146,090	\$4,824,414	\$1,494,818	115.2	23.7	8.3	150.4	191.8
Value of products	\$20,844,888	\$8,077,379	\$5,876,983	\$3,585,225	\$6,468,369	\$2,855,657	161.9	87.4	68.9	144.6	126.5

<sup>1</sup> Decrease.

<sup>2</sup> Includes proprietors and firm members, with their salaries; number only reported in 1900.

<sup>3</sup> Not reported separately.

<sup>4</sup> Not reported.

In addition to the establishments included in the above table for 1900, there were, in the states of North Carolina and South Carolina, 20 establishments each reporting a product of less than \$500. The combined capital of these establishments was \$6,336, and the total value of their product \$3,195.

The principal products of the industry are resin, which is the crude material obtained by tapping or bleeding the trees, spirits of turpentine, and rosin. The spirits of turpentine and the rosin are obtained by a distillation of the crude resin. Tar is obtained by the destructive distillation of the wood itself. Other products, such as oil of rosin, oil of tar, common pitch, brewers' pitch, etc., are obtained by a redistillation or combination of the products above mentioned. The early application of these products to shipbuilding gave rise to the generic term of "naval stores" as the designation of the industry, but as only a small proportion of the products are now used for this purpose, the term has become a misnomer.

Considered as a manufacture, the industry begins with the delivery of the crude resin at the distillery, but as the majority of the distillers own or lease the forests which supply the resin, it is found impossible to eliminate the capital and expenses pertaining to the care of these forests and the gathering of the resin so as to obtain statistics

which relate exclusively to the operations of the distilleries. Hence the capital reported includes the total amount invested in the business; the employees comprise those engaged in all branches of the industry, including those employed in the forests; and the cost of materials consists of the amounts paid for barrels, casks, cooperage stock, cooperage, etc., and for resin and fuel purchased, if any. The cost of the crude turpentine gathered by distillers operating their own forests is included in the amounts paid as wages, miscellaneous expenses, etc.

The care of the forests, the species of trees from which resin is obtained, and the methods of tapping the trees and gathering the resin, are exhaustively treated in the report of the division of forestry, Department of Agriculture, for 1892, and therefore will not be treated in this report.

In the early stages of the development of the industry, the crude resin was shipped to European and northern ports for distillation. "In the three years—1768 to 1770—88,111 barrels of crude turpentine, 20,646 barrels of pitch, and 88,866 barrels of tar were, on the average, annually exported to the mother country, representing a value of \$215,000 in our present currency."<sup>1</sup> While these figures indicate that the industry was of considerable importance

<sup>1</sup> Report of the Division of Forestry, Department of Agriculture, 1892.

prior to the Revolution, it was largely confined to the district lying between the Tar and Cape Fear rivers in North Carolina, within convenient access to the ports of Wilmington and Newbern, and consisted in gathering the resin and the destructive distillation of wood for the production of tar. Resin was distilled to some extent in northern cities; later, distilleries were operated in Wilmington and in the forests of North Carolina, thus enabling the operation to be carried on in connection with the gathering of the resin. The process was at first effected in clumsy iron retorts, but the introduction of the copper still, in 1834, led to a largely increased yield of volatile oil, and the industry received a strong impetus.<sup>1</sup> The methods of distillation have not changed materially during the one hundred years' history of the industry in the United States. The object of the operation is to obtain the largest possible quantity of spirits of turpentine from a given quantity of resin. The quantity of spirits obtained depends largely upon the character of the crude turpentine and the skill of the distiller. The crude turpentine is composed of "dip," which is the gum in a liquid state, and of "scrape," which is the solidified resin scraped from the tree. The best quality is obtained during the first year the tree is worked, and is known as "virgin dip" or soft white gum; it is almost colorless and contains the largest quantity of volatile oil. In the following year the gum is of a deeper, yellowish color, the "yellow dip," and, with each succeeding year, it becomes darker in color, more viscid, and poorer in volatile oil.<sup>1</sup> The results of the distillation of a given quantity of crude turpentine, and a clear description of the method employed, are given in the following statement taken from the report of the division of forestry, Department of Agriculture, for 1892:

#### DISTILLATION.

"The process of distillation requires experience and care in order to prevent loss in spirits of turpentine, to obtain the largest quantities of rosin of higher grades, and to guard against overheating. After heating the still somewhat beyond the melting point of crude turpentine, a minute stream of tepid water from the top of the condensing tub is conducted into the still and allowed to run until the end of the process; this end is indicated by a peculiar noise of the boiling contents of the still and the diminished quantity of volatile oil in the distillate. On reaching this point the heating of the still and the influx of water have to be carefully regulated. After all the spirits of turpentine has distilled over, the fire is removed, and the contents of the still are drawn off by a tap at the bottom. This residuum, the molten rosin, is first allowed to run through a wire cloth, and is immediately strained again through coarse cotton cloth, or cotton batting made for the purpose, into a large trough, from which it is ladled into barrels. The legal standard weight of the commercial package is 280 pounds gross, no tare being allowed.

<sup>1</sup> Report of the Division of Forestry, Department of Agriculture, 1892.

"The finest grades of rosin are largely used in the manufacture of paper, for sizing, of soaps, and of fine varnishes; the medium qualities are mostly consumed in the manufacture of yellow soap, sealing wax, in pharmacy, and for other minor purposes; and the lower and lowest qualities are used for pitch in ship and boat building, brewers' pitch, and for the distillation of rosin-oil, which largely enters into the manufacture of lubricating agents."

\* \* \* \* \*

#### COST OF ESTABLISHMENT OF PLANT AND OF WORKING THE CROP.

"Lands, with the privilege of boxing the timber for the term of four years, are rented at the rate of \$50 per crop of 10,000 boxes (about 200 acres with 4,000 to 5,000 trees). The establishment of plant for the working of 20 crops requires an investment of about \$5,000, including the still, houses, sheds, tools, wagons, and working animals, mostly mules.

"The following statement, made by an operator of many years' experience, exhibits the actual expenses incurred for the working of one crop during four years; the work is for the greatest part done by the job:

Chopping 10,000 boxes.....	\$125.00
Inspecting and tallying the same.....	15.00
Cornering 10,000 boxes.....	12.00
Raking around the trees, at \$10 per season.....	40.00
Chipping boxes during 111 weeks, at \$5 per week.....	555.00
Dipping crude resin, 650 barrels, and scraping 480 stands, at 30 cents.....	333.00
Hauling dippings and scrapings, at 30 cents per barrel..	333.00
Distilling, at 20 cents per barrel.....	222.00
Spirit barrels, 122, at \$2.80.....	305.00
Making and filling 795 barrels resin, at 30 cents.....	238.50
Superintendence of the crop.....	80.00

Total working expense of one crop.....	2,258.50
Rent of land for one crop .....	50.00

Cost of one crop..... 2,308.50

"Total expense of operating a plant of 20 crops during four years:

Labor, rent, and materials.....	\$46,170.00
Interest on capital invested, \$5,000, at 6 per cent.....	1,200.00
Loss by depreciation of plant, 10 per cent per year for four years.....	2,000.00
Taxes and incidentals.....	630.00
	50,000.00

"YIELD.—It appears that the yield of the crop of 200 acres distributes itself about as follows:

	Dip.	Scrape.	Total crude turpentine.	Total yield, per cent.	Scrape, per cent.	SPIRITS.		Rosin.
						Gallons.	Per cent.	
First year.....	Lbs. 67,200	Lbs. 16,800	Lbs. 84,000	30.9	20.0	2,100	84.4	Bbls. 250.
Second year.....	54,000	28,000	82,000	30.5	34.8	2,000	82.8	200
Third year.....	28,800	24,000	52,800	19.5	45.5	1,100	18.0	100
Fourth year.....	26,000	24,000	50,000	19.1	46.1	900	14.8	130
	178,000	92,800	270,800	100.0	42.0	6,100	100.0	580

<sup>1</sup> Evidently an error; should be 28,800.

<sup>2</sup> Evidently an error; should be 34.5.

<sup>3</sup> Evidently an error; should be 600.



"If we assume that 4,500 trees produce these amounts in four years, the yield per tree in crude turpentine is about 60 pounds. The result at the still would indicate that each tree furnishes between  $1\frac{1}{4}$  and  $1\frac{1}{2}$  gallons of spirits, and one-eighth of a barrel, or 30 pounds, of rosin of better grade, or at best 75 cents' worth of product during the four years, which has cost 55 cents to produce, leaving 5 cents net per tree per year, or from \$1 to \$1.25 per acre.

"From the fact that 4,000 acres of timber land (20 crops of 200 acres each) during four years' working produce 120,000 gallons of spirits of turpentine, or  $7\frac{1}{2}$  gallons per acre and year, it follows that to produce the 17,000,000 gallons reported as the annual product, not

less than 2,250,000 acres must be in orchard; and since the yield of the first year represents 35 per cent of the total annual yield, at least 800,000 acres of virgin forest are newly invaded annually to supply the turpentine stills in operation."

Statistics of the industry were first presented in the reports of the census of 1850, but the manufacture of naval stores had become of considerable importance prior to 1850, the reports of the Treasury Department showing that large quantities of turpentine, rosin, and tar had been exported during each year from 1790 to that time. Table 2 shows the exports of spirits of turpentine, turpentine and rosin, and tar and pitch from 1850 to 1900, inclusive.

TABLE 2.—QUANTITIES AND VALUES OF SPIRITS OF TURPENTINE, TURPENTINE AND ROSIN, AND TAR AND PITCH EXPORTED EACH YEAR: 1850 TO 1900, INCLUSIVE.

YEAR.	SPIRITS OF TURPENTINE.		TURPENTINE AND ROSIN.		TAR AND PITCH.		YEAR.	SPIRITS OF TURPENTINE.		TURPENTINE AND ROSIN.		TAR AND PITCH.	
	Gallons.	Value.	Barrels.	Value.	Barrels.	Value.		Gallons.	Value.	Barrels.	Value.	Barrels.	Value.
1850	644,616	\$229,741	898,111	\$1,142,713	133,833	(1)	1876	5,173,984	\$1,672,068	824,256	\$2,188,623	69,138	\$164,647
1851	868,828	145,410	887,220	1,068,842	112,971	(1)	1877	6,796,927	2,274,639	900,056	2,884,378	72,189	180,410
1852	858,658	187,856	449,194	1,209,173	63,254	(1)	1878	7,638,668	3,333,569	1,042,183	2,329,319	73,407	158,094
1853	634,371	347,492	454,715	1,406,483	59,144	(1)	1879	7,675,556	2,045,673	1,112,816	2,159,141	52,850	101,445
1854	1,669,523	1,055,720	601,280	1,066,306	76,989	(1)	1880	7,091,200	2,132,164	1,040,345	2,368,180	41,221	84,728
1855	2,339,138	1,137,152	731,060	1,761,428	89,999	\$288,028	1881	6,695,528	2,414,719	1,023,710	2,529,423	46,582	109,381
1856	1,844,560	839,048	524,799	1,222,066	87,765	235,487	1882	8,136,493	3,798,034	1,156,012	3,240,803	50,616	129,654
1857	1,522,177	741,846	641,517	1,644,672	96,731	208,610	1883	9,867,344	4,366,223	1,847,256	3,068,132	72,269	174,686
1858	2,457,235	1,089,282	574,573	1,464,210	42,675	100,679	1884	11,800,729	3,885,500	2,158,470	3,027,916	43,544	91,284
1859	2,682,930	1,300,068	798,083	2,248,581	64,256	141,058	1885	8,987,226	2,690,231	2,125,452	2,878,114	37,572	66,449
1860	4,072,023	1,916,289	770,652	1,818,238	60,623	151,404	1886	8,217,678	2,811,777	2,144,857	2,996,090	19,068	36,208
1861	2,941,855	1,192,787	596,207	1,060,257	55,057	143,230	1887	10,209,838	3,469,895	2,187,257	2,330,906	20,471	39,772
1862	48,507	54,691	65,441	293,400	9,765	55,884	1888	10,585,942	3,580,106	2,151,017	2,310,018	20,306	39,783
1863	58,565	143,777	17,025	237,991	11,956	102,566	1889	9,681,759	3,777,525	2,143,573	2,146,388	22,028	41,883
1864	32,548	87,988	2,418	55,551	7,156	70,732	1890	11,248,920	4,590,931	2,161,704	2,797,410	28,806	55,105
1865	51,863	106,967	11,278	153,138	11,810	77,515	1891	12,243,621	4,668,140	2,179,792	3,484,379	17,265	39,094
1866	349,825	813,086	250,452	1,504,053	87,835	147,528	1892	13,176,470	4,500,721	2,195,953	3,436,795	22,877	52,417
1867	1,513,225	980,099	334,104	1,884,565	21,557	84,552	1893	18,415,459	3,893,436	2,068,388	3,353,621	20,042	40,244
1868	3,068,629	1,627,577	443,501	2,028,514	26,751	110,641	1894	12,618,407	3,437,245	2,000,793	3,315,397	17,230	37,786
1869	3,184,955	1,444,968	588,989	2,020,519	62,241	195,025	1895	14,552,788	3,998,277	2,187,769	3,379,823	22,781	46,679
1870	3,246,697	1,357,302	588,316	1,776,625	47,401	143,400	1896	17,431,566	4,613,811	2,191,254	2,195,707	16,865	34,046
1871	2,453,554	1,009,508	511,959	1,600,651	32,584	93,884	1897	17,302,823	4,447,551	2,148,036	2,732,529	17,640	34,378
1872	4,495,441	2,521,357	692,728	3,256,354	36,722	131,010	1898	18,351,140	5,360,806	2,225,423	3,737,863	19,816	36,475
1873	5,114,653	2,667,886	845,162	3,631,996	48,555	177,435	1899	17,761,533	6,100,419	2,530,174	3,736,594	36,903	86,002
1874	6,784,173	2,753,953	929,342	3,046,431	71,920	238,779	1900	18,090,532	8,554,922	2,339,364	3,842,190	36,535	77,082
1875	5,599,624	1,924,544	937,527	2,774,419	54,905	127,206							

<sup>1</sup> The value of tar and pitch is included in that of turpentine and rosin, 1850 to 1854, inclusive.

<sup>2</sup> The quantity and value of pitch, 1884-1900, inclusive, is included with turpentine and rosin, instead of with tar.

The statistics presented in Tables 1 and 2 indicate the prosperity or depression of the industry during the past fifty years. At the census of 1850, returns were received from 856 establishments, reporting a product valued at \$2,855,657. While reports were received from only 625 establishments at the census of 1860, showing a decrease of 231 as compared with 1850, the value of the product increased to \$6,468,369, or 126.5 per cent, and the number of gallons of spirits of turpentine exported increased from 644,616 to 4,072,023. The decrease in the industry during the decade from 1860 to 1870 was due primarily to the war, and was even greater than indicated by Table 1, as the values given for the census of 1870 are expressed in a currency which was at a discount as compared with gold, and should be reduced by about one-fifth for purposes of comparison with the values for prior and subsequent decades. With the exception of temporary depressions, the industry has steadily increased, until the number of establishments amounted, in 1900, to 1,503, with a product

valued at \$20,344,888. The value of the exports of spirits of turpentine, rosin and crude turpentine, and tar and pitch for 1900, amounted to \$12,474,194. During the decade ending with 1900, the exports of spirits of turpentine to foreign countries averaged 15,504,434 gallons annually, the greatest amount, 18,351,140 gallons, being reported for the year 1898.

Turpentine distilleries are frequently located in regions difficult of access, and operated by persons who are ignorant of business methods, keep no book accounts, and are disinclined to furnish statistical information. Under these conditions, it is difficult to gather authentic data. It is possible that these difficulties were greater at prior censuses, and that the industry has not increased during the past decade to the extent indicated by the figures in Table 1. At each census the general enumerators, while enumerating the population, have secured reports from the establishments engaged in this industry. At the census of 1900 the work of the enumerators was supplemented by corre-

spondence, schedules being mailed to all distillers from whom the enumerators failed to secure reports. It is, therefore, possible that the enumeration for 1900 is more complete than that for any prior census.

The rapid increase in the products was necessary to meet the urgent demand for spirits of turpentine and rosin in various fields of industry, such as the manufacture of paint, varnish, paper, soap, lubricants, pharmaceutical prepara-

tions, for illuminating purposes, and in the rubber industry. The depletion of the forests of North Carolina and South Carolina accelerated the development of the industry in other states.

Table 3 shows the distribution of the 1,503 establishments reported in 1900 throughout the South Atlantic and Eastern Gulf states.

TABLE 3.—SUMMARY BY STATES: 1900.

	United States.	Alabama.	Florida.	Georgia.	Louisiana.	Mississippi.	North Carolina.	South Carolina.
Number of establishments.....	1,503	152	366	524	10	145	174	132
Capital:								
Total.....	\$11,847,495	\$1,176,391	\$5,526,618	\$8,785,432	\$74,539	\$798,378	\$217,423	\$268,719
Land.....	\$5,622,040	\$525,973	\$3,206,099	\$1,496,829	\$34,550	\$227,977	\$35,615	\$94,997
Buildings.....	\$1,097,240	\$111,929	\$188,376	\$355,120	\$8,240	\$99,885	\$19,745	\$18,945
Machinery, tools, and implements.....	\$1,576,948	\$161,778	\$562,172	\$559,992	\$16,125	\$153,219	\$66,671	\$55,996
Cash and sundries.....	\$3,552,267	\$376,716	\$1,269,971	\$1,378,491	\$15,624	\$317,292	\$95,392	\$103,781
Salaries of officials, clerks, etc., number.....	1,389	162	748	768	8	147	25	36
Salaries.....	\$778,694	\$67,062	\$306,351	\$320,265	\$8,490	\$67,775	\$5,460	\$8,291
Wage-earners, average number.....	41,864	3,716	15,073	19,199	302	2,288	400	886
Total wages.....	\$8,393,483	\$780,573	\$3,049,200	\$3,772,848	\$54,180	\$530,410	\$70,697	\$135,575
Men, 16 years and over.....	41,375	3,643	14,947	19,028	295	2,197	393	867
Wages.....	\$8,338,044	\$773,717	\$3,034,259	\$3,754,972	\$53,910	\$517,039	\$70,497	\$133,650
Women, 16 years and over.....	173	29	28	49		48	1	18
Wages.....	\$21,830	\$2,877	\$3,977	\$5,303		\$7,558	\$100	\$1,805
Children, under 16 years.....	315	44	98	122	7	43	1	1
Wages.....	\$33,809	\$3,979	\$10,964	\$12,573	\$270	\$5,803	\$100	\$120
Miscellaneous expenses.....	\$476,171	\$59,214	\$201,756	\$178,774	\$359	\$18,655	\$8,616	\$8,297
Cost of materials used.....	\$6,186,492	\$650,681	\$1,222,932	\$2,292,665	\$33,276	\$697,539	\$818,139	\$471,261
Value of products:								
Total.....	\$20,344,888	\$2,033,705	\$6,469,605	\$8,110,468	\$115,324	\$1,772,435	\$1,055,695	\$787,656
Spirits of turpentine:								
Number of barrels.....	754,670	74,078	236,778	305,791	4,304	64,267	39,883	29,569
Value.....	\$14,960,235	\$1,460,582	\$4,800,033	\$6,024,054	\$85,415	\$1,253,934	\$772,772	\$563,445
Rosin:								
Number of barrels.....	2,568,087	245,394	772,587	950,582	14,055	241,607	218,899	120,013
Value.....	\$5,129,263	\$190,832	\$1,639,472	\$2,655,550	\$27,319	\$461,165	\$271,852	\$183,528
Value of all other products.....	\$255,385	\$82,241	\$30,100	\$30,864	\$2,590	\$57,386	\$11,571	\$40,683

In 1850 the industry was largely confined to North Carolina, when 785, or 91.7 per cent of the establishments, with a product valued at \$2,476,252, or 86.7 per cent of the total product, were reported for that state. In 1856 the exports from the ports of Wilmington, Newbern, and Washington were 96,545 gallons of spirits of turpentine and 12,556 barrels of turpentine and rosin, 5.2 and 2.4 per cent, respectively, of the total exports of these products. The industry appears to have reached its highest point in this state about 1860, and since then has gradually decreased. In 1900 there were 174 establishments reported for the state, with products valued at \$1,055,695, or only 5.2 per cent of the total for the United States, while the exports of spirits of turpentine from the ports of the state had decreased to 53,974 gallons.

The industry does not appear to have reached as large proportions in South Carolina. There were 40 establishments, with a product valued at \$235,836, reported for the state at the census of 1850. The industry increased until 1880, when 192 establishments were reported, with a product valued at \$1,893,206, which was the largest product reported for the state. In 1900 there were 132 establishments, with a product of \$787,656. The industry appears to have reached its largest proportions in the Carolinas about 1880, when 5,821,456 gallons of spirits of turpentine and 656,019 barrels of turpentine and rosin were exported from the ports of the two states.

The industry entered the forests of Georgia during the decade ending with 1850, and 364 barrels of turpentine and rosin were exported from the port of Savannah in 1856. The apparently unlimited resources of the forests

of the state have furnished a rich field for the operations of the turpentine distillers, and the industry has been conducted with the intention of obtaining the greatest return for the immediate outlay, irrespective of the waste and wanton destruction of the forests. While the development and increase of the industry under these conditions have been rapid, the possibilities of its continued prosperity are greatly lessened. There were 14 establishments reported for the state at the census of 1850, and the products were valued at \$55,068. As shown by Table 3, Georgia and Florida now rank first and second, respectively, in the number of establishments and value of products reported for the industry, Florida being first and Georgia second with respect to capital invested. There were 524 establishments reported for Georgia, or 34.9 per cent of the total number, and the products were valued at \$8,110,468, or 39.9 per cent of the total. There were 305,791 barrels of spirits of turpentine and 950,582 barrels of rosin produced in the state, or 40.5 and 37.1 per cent, respectively, of the totals for the United States. The growth of the industry in Florida, as indicated by the census statistics, has been most marked during the last decade. There were only 5 establishments reported for the state in 1850, with a product of \$29,671. There was a considerable increase in the value of product shown in 1860, 5 establishments reporting \$100,676. There were 2 establishments, with a product of \$26,116, reported for 1870, while 10 establishments were reported for 1880, with a product valued at \$295,500; 15 were returned for 1890, with a product of \$191,859, as compared with 366 in 1900, with a product valued at \$6,469,605. The num-

ber of establishments and value of products in 1900 formed 24.4 and 31.8 per cent, respectively, of the totals for the United States. The production of spirits of turpentine amounted to 236,778 barrels and that of rosin to 772,537 barrels, being 31.4 and 30.1 per cent, respectively, of the totals for the United States.

The first indication of the existence of the industry in the state of Alabama was at the census of 1850, when 4 establishments, with a product valued at \$17,800, were reported for the state. There were 152 establishments reported for 1900, with a product valued at \$2,033,705.

The products of Mississippi and Louisiana are largely marketed through the port of New Orleans. Statistics of the exports of the United States by districts are not available prior to 1856; in that year 10,511 gallons of spirits of turpentine were exported from the port of New Orleans. At the census of 1850 there were 5 establishments, with a

product valued at \$19,680, reported for Mississippi, and 1 establishment, with a product of \$1,750, for Louisiana, and in 1900, for the former state, 145 establishments manufacturing a product valued at \$1,772,435 were reported, and for the latter, 10 establishments with a product of \$115,324 in value.

Until recent years the products of the industry were sent almost exclusively to the nearest seaport, and from there shipped to northern cities or foreign countries. Therefore, the exports from the ports of the different states are a fair indication of the extent of the industry in those states, or in the regions surrounding the ports, which, in some cases, embrace parts of adjoining states. Table 4 shows the total quantity of spirits of turpentine, turpentine and rosin, and tar and pitch exported from the ports of each state in each decennial year from 1860 to 1900, inclusive.

TABLE 4.—EXPORTS OF SPIRITS OF TURPENTINE, TURPENTINE AND ROSIN, AND TAR AND PITCH BY DECENNIAL YEARS: 1860 TO 1900.

STATE AND PORT. <sup>1</sup>	1900			1890			1880			1870			1860		
	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.
	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.
United States	18,090,582	2,389,354	36,535	11,248,920	1,619,704	28,806	7,091,200	1,040,845	41,221	3,246,697	583,816	47,401	4,072,023	770,652	60,028
Alabama	153,018	58,646	113	210		7		22,373	154	462	885	104		500	
Mobile	153,018	58,646	113	210		7		22,373	154	462	885	104		500	
Alaska		7													
Arizona			24												
California	45	535	483		25	71	6,055	125	294	1,965	76	112	1,280	2	106
San Diego	45	2	1		25	1									
San Francisco		533	482			70	6,055	125	294	1,965	76	112	1,280	2	106
Connecticut													640	10	197
Middletown														10	7
New Haven													500		174
New London													140		16
Delaware								1,375							
Florida	795,267	243,452	10	1,742	940	59	25,728	12,215	234	90	518	85			
Apalachicola	80,755	52,765													
Fernandina	157,768	14,498	5	50			25,586	8,189							
Key West				1,184	855	54	192	611	194						
Pensacola	476,167	169,281		460	66			7,067			198				
St. Johns	156	20	5	98	19	5		1,348	40	90	277	85			
St. Marks											43				
Tampa	180,421	6,888													
Georgia	14,023,328	1,408,928	2	7,251,929	841,217	40	570,549	91,909	111		519	29	137	134	34
Brunswick	3,173,410	333,019	2	1,699,447	173,104	40	131,600	11,814	80						
Savannah	11,449,918	1,075,909		5,552,482	668,113		438,949	80,095	31		519	29	137	134	34
Louisiana	212,031	47,890	379	599	1,128	126	276	5,089	110	7,558	8,423	241	11,197	18,909	800
New Orleans	212,031	47,890	379	599	1,128	126	276	5,089	110	7,558	8,423	241	11,197	18,909	800
Maine	34,103	831	3	4,062	79	2	90	528			41			160	931
Bangor	34,103	56	1								40			5	
Belfast							90								
Passamaquoddy		775		4,062	75			528			1			85	
Portland and Falmouth			2		4	2								120	931
Maryland	111	174,416	7	3,002	50,928	127	754	7,623	201	6,104	30,626	760	38,080	20,268	2,047
Baltimore	111	174,416	7	3,002	50,928	127	754	7,623	201	6,104	30,626	760	38,080	20,268	2,047
Massachusetts	2,044	18,359	1,641	29,418	7,038	1,447	50,915	3,612	6,080	52,511	11,435	6,292	123,163	16,605	13,027
Boston	2,044	18,357	1,637	29,418	7,037	1,443	50,915	3,577	6,056	52,011	10,134	6,252	122,970	15,640	12,763
Fall River															
Gloucester															
New Bedford		2	4		1	4		35	4	500	10	30	45	10	15
Salem											1,291	10	148	955	240
Michigan	307,716	3,879	225	5,434	1,939		7,639	103	54		32	39			
Detroit	25,363	3,430	173	5,434	1,939		7,639	103	54		32	39			
Huron	282,353	440	52												
Minnesota		5		7,053	5	85	362	17	7		1	1			
Duluth		5													
Minnesota				7,053	5	85	362	17	7		1	1			
Mississippi		2	7					10	10						
Pearl River		2	7					10	10						
Montana and Idaho	11														

<sup>1</sup> The names of the ports are as they appear in the reports of the Bureau of Statistics of the United States Treasury Department.

TABLE 4.—EXPORTS OF SPIRITS OF TURPENTINE, TURPENTINE AND ROSIN, AND TAR AND PITCH, BY  
DECENNIAL YEARS: 1860 TO 1900—Continued.

STATE AND PORT. <sup>1</sup>	1900			1890			1880			1870			1860		
	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine, rosin, and pitch.	Tar.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.	Spirits of turpentine.	Turpentine and rosin.	Tar and pitch.
	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.	Gallons.	Bbls.	Bbls.
New Jersey															18
Camden															18
New York	1,630,164	252,801	9,788	894,287	267,801	7,995	1,105,100	227,746	20,572	796,824	464,588	31,072	2,816,768	562,253	30,801
Buffalo Creek	15,426	4,599										741	906	41	261
Cape Vincent		14		770		25	2,050	3	204					816	
Champlain	27,728	15,880	1,606	32,425	12,259	265	101,224	10,890	8,517	69,960	4,377	4,096		4,815	
Genesee		2											31		
New York	1,587,010	231,322	8,002	861,092	254,894	7,705	1,001,826	210,780	10,820	724,764	455,688	25,694	2,800,558	555,360	29,739
Niagara													12,740	609	12
Oswegatchie		1,084	130		1,148					800		1	180	15	
Oswego								6,573	1,031	1,800	4,473	540	2,379	1,097	239
North Carolina	53,974	139,767	17,404	1,751,270	304,100	18,690	3,630,009	497,456	11,602	2,042,756	33,212	7,677	736,948	77,851	6,264
Edenton															20
Newbern													1,815	5	391
Pamlico		4	4		115	108	906	99	130	1,025	25	358			
Plymouth															101
Washington													1,238	80	192
Wilmington	53,974	139,763	17,400	1,751,270	303,986	18,584	3,629,103	497,357	11,472	2,041,731	33,187	7,319	733,840	77,766	5,560
North and South Dakota	39,649	1,774	840												
Ohio	40					8			5		1	3			
Cuyahoga	40					8			5		1	3			
Sandusky									5						
Oregon				650											
Willamette				650											
Pennsylvania	121	144	35	500	1,201	47	1,443	7,974	1,607	544	3,063	142	25,511	19,845	347
Philadelphia	121	144	35	500	1,201	47	1,443	7,974	1,607	544	3,063	142	25,511	19,845	347
Rhode Island												4	200	584	148
Bristol															30
Newport												4		74	113
Providence													200	460	
South Carolina		21,248		1,293,389	140,399	83	1,691,447	158,563		337,580	25,279	30	315,099	50,753	264
Beaufort													9,481	1,649	60
Charleston		21,248		1,293,389	140,399	8	1,691,447	158,563		337,490	25,267	30	305,613	49,104	204
Georgetown						75				40	12				
Texas	659	126	240	1,515	412	14	762	42		273	818	2			
Brazos de Santiago	90	97		580	27		742	40		240	811	2			
Corpus Christi		29	240	865	135	4	20	2			7				
Galveston	2				250	10									
Paso del Norte										23					
Saluria	567			70											
Texas										10					
Vermont	235,776	15,631	4,750				41				2			80	
Memphremagog	9,768	2,307	2,774												
Vermont	226,008	13,324	1,976				41				2			80	
Virginia			499		2,491		80	3,585		80	4,347	808	3,000	2,748	6,144
Norfolk and Portsmouth			499		2,491			3,585		80	4,087	808	3,000	1,033	6,144
Richmond							30				260			1,715	
Washington	2,525	923	135	3,860											
Puget Sound	2,525	923	135	3,860											
Wisconsin						1									
Superior						1									

<sup>1</sup> The names of the ports are as they appear in the reports of the Bureau of Statistics of the United States Treasury Department.

Considerable quantities of these products are now shipped from the distilleries by rail to Northern and Western states, and also by the same method from the ports of receipt named in the above table. For this reason, the exports do not indicate the extent of the commercial interests of the several ports represented by these products.

The boards of trade, produce exchanges, and other quasi-governmental organizations in the cities have, however, made a practice of compiling statistics of receipts at the ports, and the statistics given in Table 5 have been obtained from these sources.

TABLE 5.—SPIRITS OF TURPENTINE AND ROSIN RECEIPTS AT PORTS.

YEAR.	TOTAL.		WILMINGTON, N. C.		CHARLESTON, S. C.		SAVANNAH, GA.	
	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.
	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>
1896	465,880	1,708,484	46,568	205,187	10,871	70,240	303,867	1,143,026
1897	494,374	2,048,512	89,928	192,640	7,702	52,478	329,445	1,811,050
1898	464,086	1,760,866	35,278	163,459	3,724	38,597	318,797	1,127,180
1899	488,279	1,766,374	27,981	161,161	2,513	28,085	329,466	1,128,942
1900	461,227	1,705,220	29,761	167,816	1,851	25,949	309,465	1,076,815
1901	498,285	1,755,700	25,541	181,743	2,438	17,681	387,452	1,119,957

  

YEAR.	BRUNSWICK, GA.		MOBILE, ALA.		NEW ORLEANS, LA.		GARRABELLE, FLA.	
	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.	Turpentine.	Rosin.
	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>	<i>Barrels.</i>
1896	56,588	215,544	20,314	57,745	12,160	56,348	5,067	15,444
1897	66,799	287,416	125,000	1100,000	15,018	87,598	10,482	87,380
1898	65,161	250,152	18,700	50,200	16,605	69,049	15,826	62,279
1899	72,838	257,749	19,004	65,271	17,290	68,772	19,192	66,894
1900	69,489	240,884	13,964	47,366	20,954	91,255	15,743	55,635
1901	71,755	221,757	25,445	68,361	19,268	83,588	16,391	62,613

<sup>1</sup> Estimated.

As shown by Table 3, the total product of spirits of turpentine in the United States during the year 1900 amounted to 754,670 barrels. From Table 5 it appears that 461,227 barrels were received for distribution at the principal ports during that year. These figures therefore indicate that 293,443 barrels were shipped directly from the distilleries to internal points of consumption. The boards of trade of Cincinnati and St. Louis, respectively, report receipts of 52,387 and 18,000 barrels of spirits of turpentine, making a total of 70,387 barrels; but as many points of receipt have no available records, it is impossible to make satisfactory compilations.

The capital invested in the industry in 1900 amounted to \$11,847,495. Table 3 shows that this amount consisted of land valued at \$5,622,040; buildings valued at \$1,097,240; machinery, tools, and implements valued at \$1,575,948; and cash on hand, bills receivable, unsettled ledger accounts, and miscellaneous items of live capital amounting to \$3,552,267. In many instances the land is not owned by the distillers, but is leased for a crop, which generally extends over a period of three or four years. The amount reported for value of land is the land which was owned by the distillers, and includes not only the land on which the still was located, but the forests from which the crude material was obtained. From Table 7 it appears that \$18,714 was paid for rent of works, which represents the yearly expense for the use of the forests. Considered strictly as a manufacturing industry,

the amount invested in forest lands should be deducted from the total capital, leaving \$6,225,455 as the amount of capital engaged in manufactures, as compared with a product valued at \$20,344,888.

In some instances the conditions under which the turpentine industry is conducted are anomalous. For instance: The distillers are, in many cases, advanced money by factors or commission merchants, with which to carry on their operations for a year, the prospective crop being mortgaged to secure the payment of the advances, the factor controlling the output. Under these conditions, the amount of live capital (cash on hand, bills receivable, unsettled ledger accounts, etc.) was abnormally large, including, as it did, the borrowed cash and the amounts represented by bills receivable for products shipped to the commission merchants. It formed 30 per cent of the total capital reported for the industry.

As previously explained, the amount, \$6,186,492, reported as the cost of materials used, does not include the value of the crude turpentine gathered by distillers, but represents only the amounts actually purchased. Using as a basis the reports for establishments that purchase crude turpentine, the office has estimated the total quantity of crude turpentine gathered, and Table 6 presents the total quantity gathered in each state, the quantities and values of the different classes of products, and the average values per barrel of spirits of turpentine and rosin.

TABLE 6.—QUANTITY OF CRUDE TURPENTINE GATHERED, QUANTITIES AND VALUES OF PRODUCTS, AND AVERAGE VALUES PER BARREL OF SPIRITS OF TURPENTINE AND ROSIN, BY STATES: 1900.

STATES.	Crude turpentine gathered.	PRODUCTS.						
		Total value.	Spirits of turpentine.			Rosin.		
			Quantity.	Value.	Average value per barrel.	Quantity.	Value.	All other products, value.
	Barrels.		Barrels.			Barrels.		
United States	4,088,161	\$20,344,888	754,670	\$14,960,235	\$19.82	2,563,087	\$5,129,268	\$255,385
Alabama	378,005	2,033,705	74,078	1,460,582	19.72	245,894	490,882	82,241
Florida	1,212,935	6,409,605	236,778	4,800,088	20.27	772,537	1,639,472	30,100
Georgia	1,515,569	8,110,468	305,781	6,024,054	19.70	950,582	2,055,550	80,864
Louisiana	20,239	115,324	4,394	85,415	19.85	14,055	27,319	2,590
Mississippi	869,629	1,772,435	64,287	1,258,934	19.51	241,607	461,165	57,536
North Carolina	861,729	1,055,695	89,883	772,772	19.37	218,899	271,352	11,571
South Carolina	190,095	787,656	29,569	563,445	19.06	120,013	183,528	40,683

From Table 6 it appears that the total value of products, \$20,344,888, consists of \$14,960,235, the value of 754,670 barrels of spirits of turpentine; \$5,129,268, the value of 2,563,087 barrels of rosin; and \$255,385, the value of the miscellaneous products, such as tar, pitch, rosin-oil, charcoal, refined tar, etc. There were 4,088,161 barrels of crude turpentine consumed by the 1,503 establishments reported. From the distillation of the 4,088,161 casks of crude turpentine resulted 24.4 per cent of spirits of turpentine, 54.5 per cent of rosin, and 21.1 per cent of other products. In obtaining the above percentages, the crude turpentine, rosin, and spirits of turpentine were reduced to pounds, the reduction being based, in the case of crude turpentine and rosin, on the standard weights of the packages, and, in the case of spirits, on the generally accepted specific gravity of the oil.

The totals for all classes of establishments were used, those operating on "virgin dip" as well as those obtaining the raw material in the second, third, or even later years of the period during which the forests were worked. The purity of the crude turpentine, its freedom from "scrape" dirt, sticks, and leaves, and the skill of the operator are the principal factors in the production of a large percentage of spirits. The percentage of waste depends very largely on the care with which the molten rosin is strained. If the rosin is passed through a cloth or fine screen and all "dross" carefully removed, the percentage of waste will be increased.

The following is a statement of the quantities of spirits of turpentine and rosin manufactured during 1900, showing the exports and the domestic consumption:

	Spirits of turpentine.	Rosin.
	Gallons.	Barrels.
Domestic production	38,488,170	2,563,087
Exports	18,090,582	2,369,118
Domestic consumption	20,397,588	193,969

According to this statement, the consumption of spirits of turpentine in the United States is 20,397,588 gallons, or 53 per cent of the quantity manufactured; and of rosin, 193,969 barrels, or only 7.6 per cent of the entire output of the stills.

The imports of the above products are so small as hardly to deserve consideration, there being only 22,183 gallons of spirits and no rosin imported. In the statement the domestic production is reduced to gallons by multiplying by 51, which is generally accepted as the average number of gallons to a barrel.

The statistics for the census of 1900 are presented in detail for each state in Table 7. The highest proportion of spirits and the lowest proportion of waste are reported for the state of Louisiana. It is possible that the distillers in that state obtained a quantity of "virgin dip" during the census year. The lowest proportion of spirits and the highest proportion of waste are reported for North Carolina, where the industry is oldest and the percentage of "virgin dip" is, therefore, small.

Considering the proportions shown in Table 6 in connection with the percentages presented in the statement on page 4, it must be remembered that the figures on which the latter statement is based were obtained from representative establishments, and therefore can not be accepted as indicating the results of the operations of all the distillers in the United States. It is probable that the majority of the distillers are now engaged in working their forests during the second and third years. Therefore, the general percentage of spirits of turpentine would be about as shown for the "third year" in the statement on page 4.

TABLE 7.—TURPENTINE AND ROSIN, BY STATES: 1900.

	United States.	Alabama.	Florida.	Georgia.	Louisiana.	Mississippi.	North Carolina.	South Carolina.
Number of establishments.....	1,503	152	366	524	10	145	174	182
Character of organization:								
Individual.....	713	67	123	232	2	64	140	85
Firm and limited partnership.....	726	79	230	272	7	63	33	42
Incorporated company.....	62	5	13	20	1	17	1	5
Miscellaneous.....	2	1				1		
Established during the decade.....	1,074	137	310	364	8	110	83	62
Established during the census year.....	188	44	14	76	1	25	11	15
Capital:								
Total.....	\$11,847,495	\$1,176,391	\$5,528,618	\$3,785,432	\$74,539	\$798,373	\$217,428	\$268,719
Land.....	\$5,622,040	\$525,973	\$3,208,099	\$1,496,829	\$34,550	\$227,977	\$35,615	\$94,997
Buildings.....	\$1,097,240	\$111,929	\$488,376	\$355,120	\$3,240	\$99,885	\$19,745	\$18,945
Machinery, tools, and implements.....	\$1,575,943	\$161,773	\$562,172	\$559,992	\$16,125	\$158,219	\$66,671	\$55,996
Cash and sundries.....	\$3,552,267	\$376,716	\$1,269,971	\$1,378,491	\$15,624	\$817,292	\$95,892	\$108,781
Proprietors and firm members.....	2,192	236	552	815	15	198	205	171
Salaries of officials, clerks, etc.:								
Total number.....	1,839	162	748	763	8	147	25	86
Total salaries.....	\$778,694	\$67,082	\$306,351	\$320,265	\$3,490	\$67,775	\$5,460	\$3,291
Officers of corporations:								
Number.....	28	4	7	6		8	2	1
Salaries.....	\$22,620	\$2,300	\$8,000	\$4,020		\$7,100	\$600	\$800
General superintendents, clerks, and salesmen:								
Total number.....	1,861	158	741	757	8	139	28	85
Total salaries.....	\$766,074	\$64,762	\$298,351	\$316,245	\$3,490	\$60,675	\$4,560	\$7,991
Men:								
Number.....	1,856	157	738	756	8	139	23	85
Salaries.....	\$764,812	\$64,090	\$297,451	\$315,955	\$3,490	\$60,675	\$4,800	\$7,991
Women:								
Number.....	5	1	3	1				
Salaries.....	\$1,262	\$72	\$900	\$290				
Wage-earners, including pieceworkers, and total wages:								
Greatest number employed at any one time during the year.....	55,563	5,264	20,848	28,459	371	3,727	589	1,810
Least number employed at any one time during the year.....	39,942	3,525	14,718	17,959	252	2,204	368	916
Average number.....	41,864	8,716	16,073	19,199	302	2,288	400	886
Wages.....	\$8,393,433	\$780,573	\$3,049,200	\$3,772,848	\$54,180	\$580,410	\$70,697	\$185,675
Men, 16 years and over:								
Average number.....	41,375	3,643	14,947	19,028	295	2,197	398	867
Wages.....	\$8,393,044	\$778,717	\$3,034,259	\$3,754,972	\$53,910	\$517,039	\$70,497	\$183,650
Women, 16 years and over:								
Average number.....	173	29	23	49		48	1	18
Wages.....	\$21,630	\$2,877	\$3,977	\$5,303		\$7,668	\$100	\$1,805
Children, under 16 years:								
Average number.....	316	44	98	122	7	43	1	1
Wages.....	\$33,809	\$3,979	\$10,964	\$12,573	\$270	\$5,803	\$100	\$120
Average number of wage-earners, including pieceworkers, employed during each month:								
Men, 16 years and over:								
January.....	42,210	3,840	16,039	19,052	303	1,960	269	747
February.....	43,103	3,994	16,473	19,133	321	2,156	261	765
March.....	46,437	4,265	17,204	20,748	331	2,672	357	910
April.....	45,818	4,185	16,660	20,355	314	2,819	442	1,043
May.....	46,102	4,157	16,618	20,556	326	2,843	495	1,107
June.....	42,190	4,248	14,230	19,648	317	2,250	514	1,023
July.....	38,984	3,268	12,925	18,929	284	2,118	501	959
August.....	38,748	3,294	13,010	18,645	277	2,113	490	919
September.....	38,674	3,215	13,255	18,488	262	2,104	468	892
October.....	38,812	3,205	13,675	18,371	285	2,015	425	836
November.....	37,217	3,017	14,164	17,158	264	1,679	320	615
December.....	38,156	3,027	15,053	17,358	254	1,635	241	588
Women, 16 years and over:								
January.....	224	20	32	81		47	1	43
February.....	173	20	34	57		46		16
March.....	169	23	34	46		48	2	16
April.....	189	50	27	44		50	2	16
May.....	188	50	27	44		49	2	16
June.....	174	34	27	43		52	2	16
July.....	171	34	23	45		51	2	16
August.....	166	34	24	39		51	2	16
September.....	164	30	21	45		49		16
October.....	144	17	24	39		48		16
November.....	159	20	26	52		45		16
December.....	158	20	29	47		41		16
Children, under 16 years:								
January.....	344	56	89	152	5	37		5
February.....	335	53	100	134	5	38		5
March.....	337	56	97	125	5	49		5
April.....	371	78	103	129	8	52	1	
May.....	378	76	107	131	8	55	1	
June.....	319	34	96	128	8	52	1	
July.....	282	27	83	119	8	44	1	
August.....	282	31	88	115	8	39	1	
September.....	284	30	101	105	8	39	1	
October.....	285	30	99	109	8	39		
November.....	280	26	108	104	5	39		
December.....	290	26	109	114	5	36		
Miscellaneous expenses:								
Total.....	\$476,171	\$59,214	\$201,756	\$178,774	\$959	\$18,655	\$8,516	\$8,297
Rent of works.....	\$18,714	\$8,015	\$2,593	\$1,998		\$1,017	\$1,881	\$2,210
Taxes, not including internal revenue.....	\$30,913	\$8,157	\$38,946	\$26,714	\$424	\$4,178	\$1,110	\$1,339
Rent of offices, insurance, interest, and all sundry expenses not hitherto included.....	\$216,230	\$24,616	\$82,911	\$86,681	\$235	\$13,249	\$4,465	\$4,073
Contract work.....	\$160,309	\$18,426	\$77,306	\$63,381	\$300	\$211	\$60	\$625
Cost of materials used:								
Total.....	\$6,186,492	\$650,681	\$1,222,932	\$2,292,665	\$33,275	\$697,539	\$318,139	\$471,261
Crude turpentine purchased.....	\$4,642,383	\$475,953	\$671,371	\$1,673,995	\$22,026	\$573,679	\$719,907	\$405,532
Fuel.....	\$88,604	\$11,512	\$22,522	\$25,133	\$2,354	\$13,085	\$7,206	\$6,792
Mill supplies.....	\$8,008	\$1,066	\$4,178	\$2,537	\$1	\$155	\$65	\$6
All other materials.....	\$1,486,630	\$143,659	\$503,764	\$576,658	\$7,369	\$107,921	\$39,673	\$57,586
Freight.....	\$60,867	\$18,491	\$21,097	\$14,342	\$1,525	\$2,799	\$1,288	\$1,325



TABLE 7.—TURPENTINE AND ROSIN, BY STATES: 1900—Continued.

	United States.	Alabama.	Florida.	Georgia.	Louisiana.	Mississippi.	North Carolina.	South Carolina.
<b>Products:</b>								
Total value	\$20,844,888	\$2,088,705	\$6,469,605	\$8,110,468	\$115,324	\$1,772,435	\$1,055,695	\$787,656
Spirits of turpentine:								
Number of barrels	754,670	74,078	236,778	305,791	4,804	64,267	39,883	29,569
Value	\$14,960,235	\$1,460,582	\$4,800,033	\$6,024,054	\$35,415	\$1,253,934	\$772,772	\$568,445
Rosin:								
Number of barrels	2,563,087	245,394	772,587	950,582	14,055	241,607	218,899	120,913
Value	\$5,129,288	\$490,882	\$1,639,472	\$2,055,550	\$27,319	\$461,165	\$271,852	\$183,528
Value of all other products	\$256,885	\$82,241	\$80,100	\$80,864	\$2,590	\$57,336	\$11,671	\$40,683
<b>Comparison of products:</b>								
Number of establishments reporting for both years	597	58	118	219	2	47	84	79
Value for census year	\$9,198,442	\$923,578	\$2,707,719	\$3,899,129	\$15,800	\$593,977	\$540,446	\$517,793
Value for preceding business year	\$7,813,259	\$842,027	\$2,217,754	\$3,810,508	\$13,900	\$500,180	\$500,303	\$428,642
<b>Power:</b>								
Number of establishments reporting	135	6	63	62	1	1	2	
Total horsepower	856	50	850	422	5	10	29	
Engines, steam:								
Number	116	7	50	54	2	1	2	
Horsepower	706	50	219	398	5	10	29	
Other power:								
Number	28		21	7				
Horsepower	160		131	29				
<b>Establishments classified by number of persons employed, not including proprietors and firm members:</b>								
Total number of establishments	1,508	152	866	524	10	145	174	132
No employees	16	1				2	11	2
Under 5	272	13	5	15	1	89	136	63
5 to 20	253	37	35	73	1	37	21	49
21 to 50	533	67	132	262	6	45	6	15
51 to 100	347	27	157	138	2	20		3
101 to 250	79	7	34	36		2		
251 to 500	8		3					